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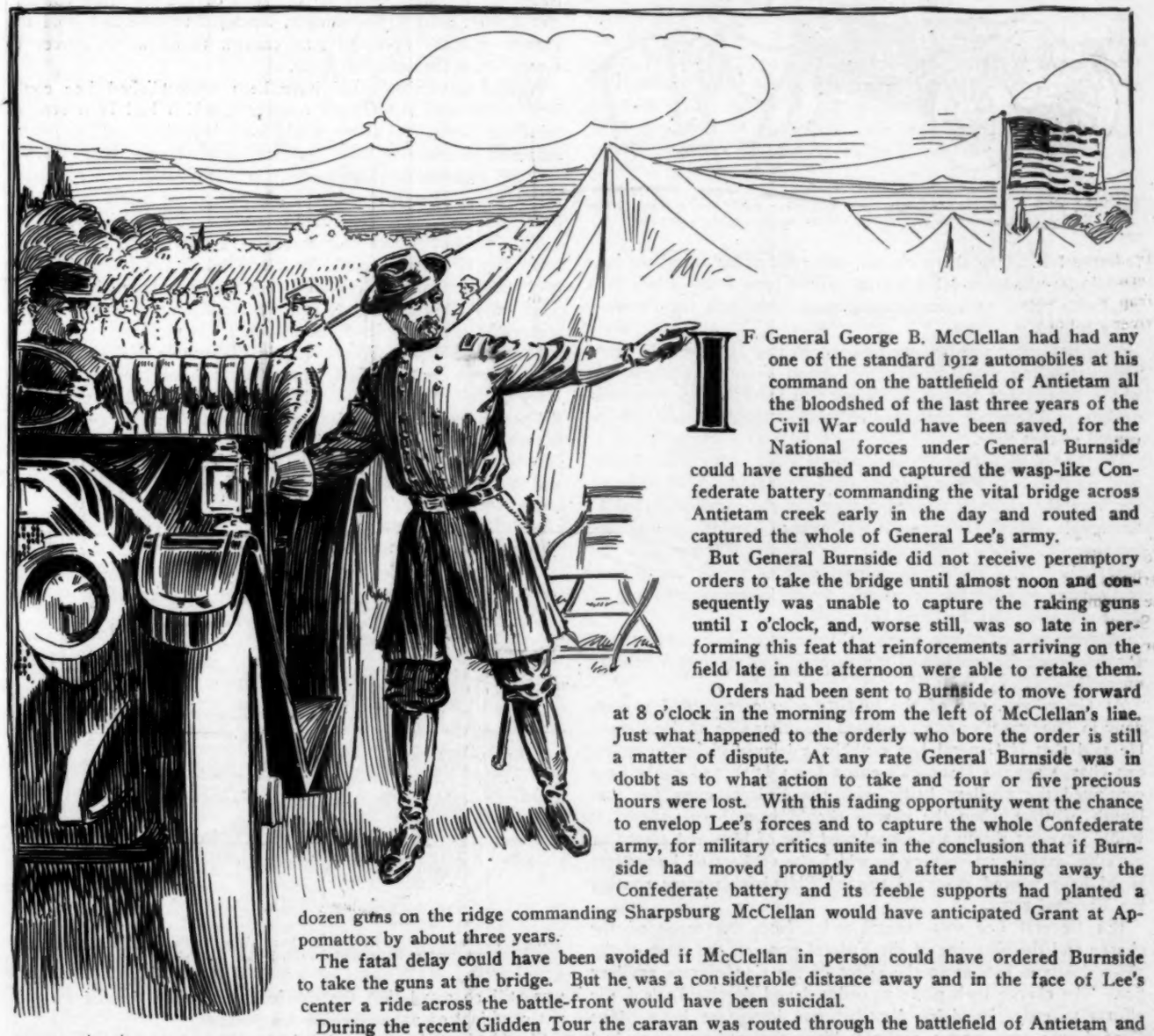
THE AUTOMOBILE

Automobile Might Have Altered Map



IF General George B. McClellan had had any one of the standard 1912 automobiles at his command on the battlefield of Antietam all the bloodshed of the last three years of the Civil War could have been saved, for the National forces under General Burnside could have crushed and captured the wasp-like Confederate battery commanding the vital bridge across Antietam creek early in the day and routed and captured the whole of General Lee's army.

But General Burnside did not receive peremptory orders to take the bridge until almost noon and consequently was unable to capture the raking guns until 1 o'clock, and, worse still, was so late in performing this feat that reinforcements arriving on the field late in the afternoon were able to retake them.

Orders had been sent to Burnside to move forward at 8 o'clock in the morning from the left of McClellan's line. Just what happened to the orderly who bore the order is still a matter of dispute. At any rate General Burnside was in doubt as to what action to take and four or five precious hours were lost. With this fading opportunity went the chance to envelop Lee's forces and to capture the whole Confederate army, for military critics unite in the conclusion that if Burnside had moved promptly and after brushing away the Confederate battery and its feeble supports had planted a dozen guns on the ridge commanding Sharpsburg McClellan would have anticipated Grant at Appomattox by about three years.

The fatal delay could have been avoided if McClellan in person could have ordered Burnside to take the guns at the bridge. But he was a considerable distance away and in the face of Lee's center a ride across the battle-front would have been suicidal.

During the recent Glidden Tour the caravan was routed through the battlefield of Antietam and the possibilities of the automobile to a general in McClellan's predicament were made very apparent.

The commanding general was stationed behind Porter's troops in the center, fully three miles from Burnside. The whole space between his headquarters and Burnside was swept by Confederate cannon. But running southeast from his headquarters and away from the battle front lay the Shepherdstown pike, a fair stone road even in those days. This road circles back from Antietam creek and forms a junction with the pike road crossing the very bridge in Burnside's front.

With a powerful automobile General McClellan could have started from the center as soon as it was discovered that Burnside had

not swept over the bridge at 8 o'clock and by traveling not more than 10 miles, a matter of probably 15 minutes' driving at most, could have appeared in person to direct the charge. He could have changed commanders on the field if he had so desired or he could have taken active charge of the movement himself.

Throughout the trip from his headquarters to the left of the line he would not have been under fire for a minute and by his presence he could have insured the success of the advance.

At the time Stonewall Jackson's division had been driven back on the right and with Mansfield's and Sumner's corps the National troops engaged were gradually enveloping the Con-

Equipped with a fast headquarters car McClellan could have reached the bridge in 15 minutes and taken charge of the field in person

federate left. One sharp charge, one rush order for three batteries of artillery and Lee's army would have been caught in a trap with 70,000 men surrounding their front and the Potomac river behind.

It was a great opportunity and would have crushed the Confederacy three years before that event finally happened. It would have saved billions in money and hundreds of thousands of human lives, but unfortunately the automobile was not invented at that time.

On the Glidden Tour the cars moved slowly across this battlefield on their way from Gettysburg to Staunton. Practically all the way the caravan crossed fields that were once devoted to human slaughter. Of course it was vain to consider such things, but there was many an old soldier, or the son or grandson of an old soldier, who could not refrain from drawing some comparisons as to what the automobile would have meant to any of the commanders in the Civil War.

Starting at Gettysburg, every field presented some opportunity for discussing the problem of transportation as applied to military operations.

At Gettysburg, one of the tourists who commanded a company in Longstreet's army presented the other side of the picture. He said that if General Lee could have delayed Pickett's marvelous charge against Hancock's corps for 1 hour and could have continued the artillery battle with the Federal guns for that length of time when the charge should have been ordered it would have cut through the weakened line of blue and served as a wedge, making an opening by which the soldiers of Longstreet could have poured eastward toward Philadelphia after routing the National army.

But General Lee was several miles from the scene of the charge and the silencing of the Federal guns on the crest of the ridge deceived him as to the effect of the Confederate artillery fire. The charge took place as ordered and despite Lee's futile efforts to cause its delay for that one important hour. The Confederate commander realized after the arrangements had been made that the cannon fire had not been continued long enough and if he had had at his service a fast automobile to convey him or one of his aides to check the infantry charge until the guns had finished their work, there is more than a strong possibility that the cause of the South would have scored heavily. At this particular moment a great victory for Lee would have resulted in recognition of the South as a belligerent by one or more great European nations and its actual effect upon the North would have been profound.

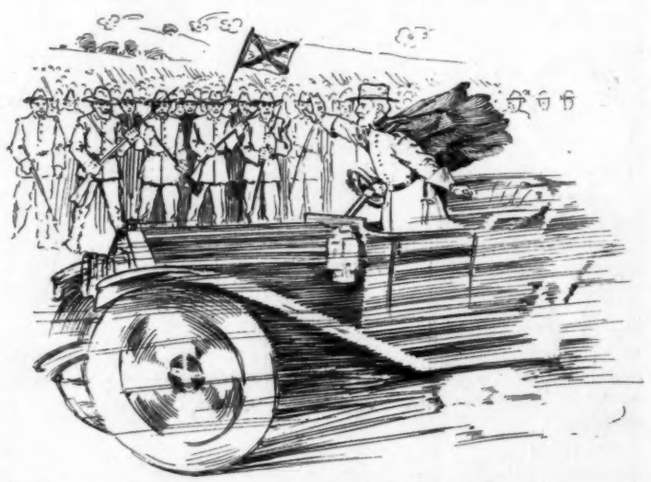
Crossing into Virginia and entering the Shenandoah valley, the opportunities for changing the whole political complexion of the nation if either side had been equipped with the ordinary touring cars of 1912 are impressive.

If General Jubal A. Early or General Sheridan had had a good fast touring car on the route followed by the Glidden Tour in 1911 the Confederacy would have been prolonged indefinitely or crushed promptly, depending upon which side possessed the car. Early could have captured Custer's division one day early in the final campaign in the Shenandoah if he could have had just 10 minutes' start in throwing one of his cavalry brigades between the Union troops and the Potomac river. An automobile circling to the rear could have conveyed the commander or his aide to the officer in charge of the brigade and started the well-planned movement to take Custer's soldiers that was only frustrated by a trifling delay on the part of the investing column. But Custer, alert to his danger, managed to take and hold the crossing of the Potomac long enough to allow his forces to escape from the superior force.

If this movement could have been accomplished Lee could have withdrawn Anderson's command, which had been sent to reinforce Early, and there would have been just that many more seasoned veterans to face Grant at Spottsylvania, Cold Harbor and the subsequent engagements. It also would have weakened Sheridan so that the ultimate destruction of Early could not have seen accomplishment in the way that actually happened.

The battle of Winchester would have proved the last fight in the valley if Sheridan could have ordered up his second line one hour earlier than he was able to do using mounted orderlies. This delay allowed Early to concentrate his forces and prevented a much worse Confederate defeat than was suffered.

If at this juncture General Lee had been able to double the reinforcements sent to Early there might have been a different story to tell, but owing to the lack of definite information in the possession of the Confederate commander, all of which could have been conveyed to him if there had been a good, fast automobile at hand, when Early's partial reinforcements did arrive and he started to drive Sheridan back through the valley his force



With a fast automobile Lee might have delayed Pickett's charge for one invaluable hour and avoided the Gettysburg reverse

was still so small that the Confederate leader showed he was not confident of accomplishing his purpose.

Sheridan's main body of infantry was at Harrisonburg, the funny little village where the Glidden tourists were held up for speeding. The troops slowly retired toward the north, burning everything edible and destroying all property except the houses This continued to Cedar Creek, which lies some 20 miles south of Winchester, where Sheridan took up a strong position and awaited the approach of the enemy.

At this period of the campaign the authorities at Washington, unable to communicate at length with Sheridan, ordered him to appear at the capital for conference as to the conduct of the campaign. One automobile would have removed the necessity for this trip and made unnecessary the spectacular consequences that resulted from the absence of the commander.

It appears that the work of devastating the valley had been done so completely by the retiring Northern troops that Early could find little food for his men and horses and was forced to take immediate action or retire from the valley. In the still of the night Early moved out from his position to the south of Strassburg and before the Union troops were aware of this action, he had flanked the advance corps. The gray column faced to the flank and dashed in upon the unready Federals, rolling the disordered regiments together and throwing the whole army into such confusion that it seemed that the National army would be routed.

Sheridan had returned as swiftly as possible from Washington and had arrived at Winchester when he heard the dull booming of Early's artillery. Instantly the youthful general was in the saddle and dashing for the battle line.

Gallant and speedy as his great black charger proved himself, the progress of the general was necessarily slow. For a full hour Early's hungry soldiers plundered the captured position of the Union troops and occasionally desisted long enough to break some northern regiment that tried to retire in some sort of regular formation.

The Southern troops were about ready to plunge after the retreating enemy when the slight, young Sheridan mounted on a badly exhausted horse came to the mob of retreating soldiers and shouted orders for them to rally and face about. Sheridan was on time—just on time. He proved himself to be a resourceful officer and took advantage of all the facilities within reach.

He turned the tide of rout into a last desperate stand and while the front of battle held the charging Early the reserves rallied behind the line and then were added to the resisting column. At the critical moment the gray host began to waver and Sheridan ordered forward his cavalry, breaking the assaulting lines and sending Early whirling up the devastated valley.

But—if Sheridan had had one 40-horsepower automobile, like any of two score in the Glidden column. If that automobile had been lying at Winchester ready to do his bidding at a second's notice. Then Sheridan's ride from "Winchester 20 miles away" would have read somewhat differently.

Instead of riding his big black horse at the break-neck speed of 15 miles an hour, the general simply would have said to his chauffeur: "James, this is not Harrisonburg, hit it up a bit, we are due at Cedar Creek in 30 minutes.'

James would have touched the self-starting lever, dropped in his clutch and with a skillful shift of the gears would have been in high within 100 yards. Then, with James' foot on the throttle-lever, the General's car would have streaked it for Kernstown. The valley pike was in good shape in '64, the 4 miles could have been done in 5 minutes. From there to Stephens City, another 4 miles, there was a little more difficulty and it probably would have required 6 minutes. But to Middletown the road was found to be fine again and 4 miles would be reeled off in 4 minutes.

At Middletown, according to history, Sheridan met the first of the routed troops. He could have ordered James to slow down to a regular Mount Crawford gait while he rallied the panic-stricken soldiers, taking probably 1 minute to do so. Then James could hit it up once more to Strassburg, needing probably about 5 minutes to make the 4 miles, on account of the sharp grade and toll-gates to be found near that place. Here the general would be in the midst of the routed Northern troops and he could profitably spend 3 minutes in telling them how many different kinds of idiots they were, as he is reputed to have done when he rode into Strassburg in '64.

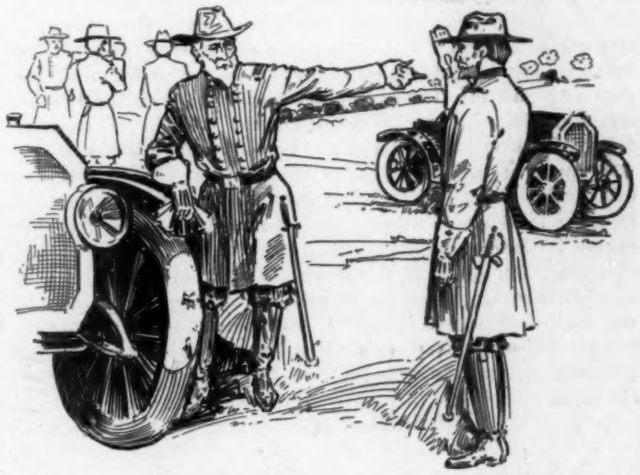
Cedar Creek and Early's famished hordes lay just about 4 miles to the South and the presence of the general in his automobile undoubtedly would have caused much more speed in rallying. Then the final dash might have occupied 6 minutes. The whole trip, rallying time and all, need not have been more than just 30 minutes, while in actual time Sheridan's ride took 2 hours.

Minutes are valuable in battle just as they are at a fire. It is the first 5 minutes at a fire that counts and it is the first hour in a battle, particularly when there is a chance to prevent a rout or to destroy an enemy.

If Stonewall Jackson had a car in 1861, there would be slavery in New York to-day if such a result had been the object of the campaign. If McClellan had an automobile at Antietam, Lee would have succumbed right there. If at nearly any one of fifty critical periods on either side during the war one of the commanders had been possessed of a standard touring car of 1912 type, the battle could have been reversed in its outcome, with all that such a result might mean. Naturally, in the next war both sides will be equipped with automobiles for messenger and other service and the advantage to be gained by sole possession of a car would be lost. Consequently the purpose of this fanciful article is to show the difference between transportation conditions in the Civil War and as they are to-day with respect to the automobile.

As a matter of cold, hard fact the Civil War never could have occurred if the automobile had been invented 50 years before the time it was.

History shows that almost all war has resulted from misunderstanding, and as the automobile demands good roads and as good roads make for better understanding among residents of different sections, the automobile would have served to prevent hostilities.



General Early, with a fast car at his disposal, could have overcome the 10 minutes' time which enabled Custer to slip from his net

During the recent Glidden Tour this point was well illustrated. The column contained practically half and half of Northerners and Southerners. In the North, the Dixieites learned that their countrymen of New Jersey and Pennsylvania did not grow horns and had no hoofs, while south of Mason and Dixon's line the Yankee tourists discovered that the people of Virginia, the Carolinas, Georgia and Florida were human beings with practically all of their own ambitions, hopes and aspirations.

Before, during and for 20 years after the close of the war there was no such understanding.

Of course, the Glidden Tour was only one small enterprise when compared with the sum total of intersectional communication based upon the automobile, and the lessons taught by it are of relatively small importance except as illustrations.

In the United States touring is classed among the highest grades of pleasure. It is growing more and more general each year and conjectures as to its future development are interesting.

In the days of Marco Polo nothing whatever was known about the outside world, except by a few sailors and adventurers, and as a result of the dense ignorance of that period every valley, river, and mountain that was not directly in contact with present observation was peopled with dragons, giants and spirits by the imagination of the inhabitants of every other valley, river, and mountain.

During the period of Roman supremacy, all other nations were deemed barbarians. Before the American Revolution the British monarch and most of his advisers considered the Americans criminals, descendents of criminals and generally inferior.

At the outbreak of the Civil War, the North considered the majority of the residents of the South as being ignorant, illiterate and of small importance, while the remainder were arrogant, overbearing, slave-owning aristocrats. On the other hand, the South looked upon the North as being hopelessly common and commercial, with a strong bent for stealing what the South considered personal property and a general tendency to interfere with things in which the North had no concern.

Senator Hoke Smith of Georgia, the leading advocate of good roads in the South, has stated distinctly on many platforms that the war could not have occurred if good interstate roads had been in existence. As the beginning of good interstate roads dates from the vogue of the motor car, and should be credited exclusively to the motor car, the influence of the car in spreading knowledge and as a deterrent to war must be acknowledged.

Another thing that the automobile has accomplished is in the way of colonization. To-day the South is dotted with communities less than 5 years old that have a distinctly Northern element in their population. The automobile has already demonstrated its service as a means of solving some of the problems of congested urban life. The very process of such demonstration has served to show the possibilities of country life and this has done a large work in bringing about the colonization referred to.

In southern Georgia and at many points in Florida there are new agricultural developments that may be credited in large measure to the automobile. One particular instance found in north Florida may be cited: The community referred to consists of 57 families, 32 of which came from the North. In this community there are 14 automobiles of various types and at Jacksonville it was learned that six other families are considering the purchase of cars next spring. Needless to say the roads of that particular community are different from those in other places along the sand belt.

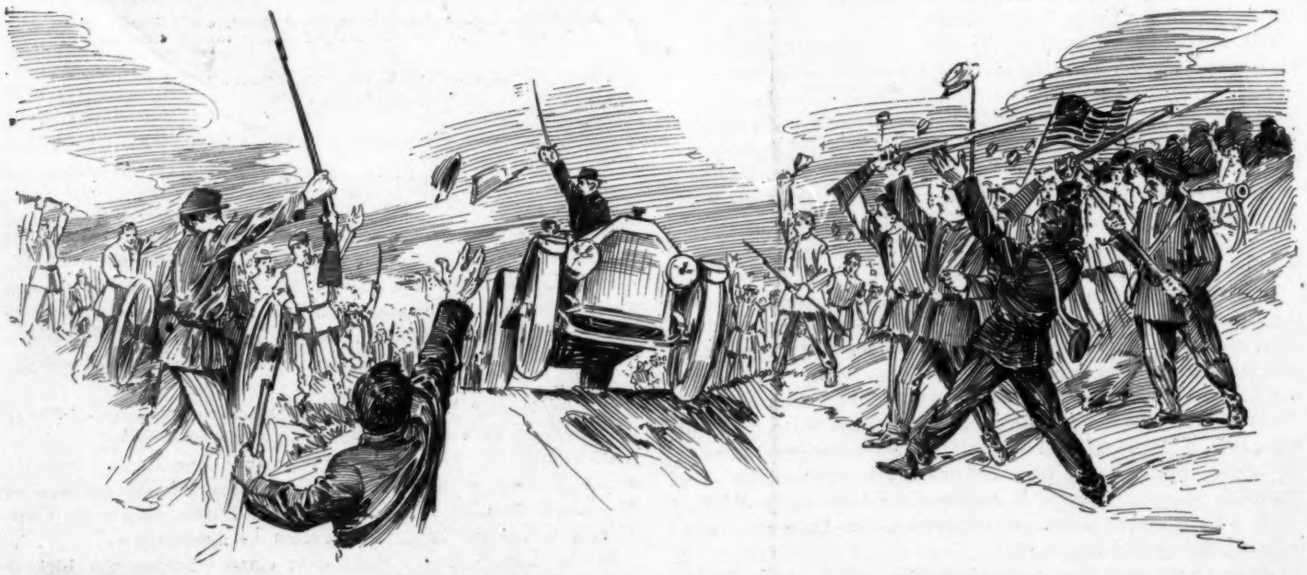
To sum up the whole situation in sequence: The mission of the automobile is worldwide. The automobile is useless without good roads. Therefore, the automobile brings good roads. Good roads mean easier communication between states, cities and communities. Therefore, the installation of good roads means quicker transportation of agricultural produce to market; added intelligence applied to the production of the fields; better and cheaper transportation of manufactured merchandise back to the communities and greater care in the manufacture of the goods demanded by the citizens of such advanced communities; more wealth all around and increased joy in living and working.

Italy and Austria Using War Automobiles

Italy, in getting upon her war legs, made it her first duty to equip her army with every modern convenience for the conduct of her campaign against the Turks in Tripoli. She has added the automobile to the general outfit, placing a number at the service of the Red Cross corps. But she is not going to stop here. She will add motor-ambulances to the original complement, thus facilitating the work on the battlefield.

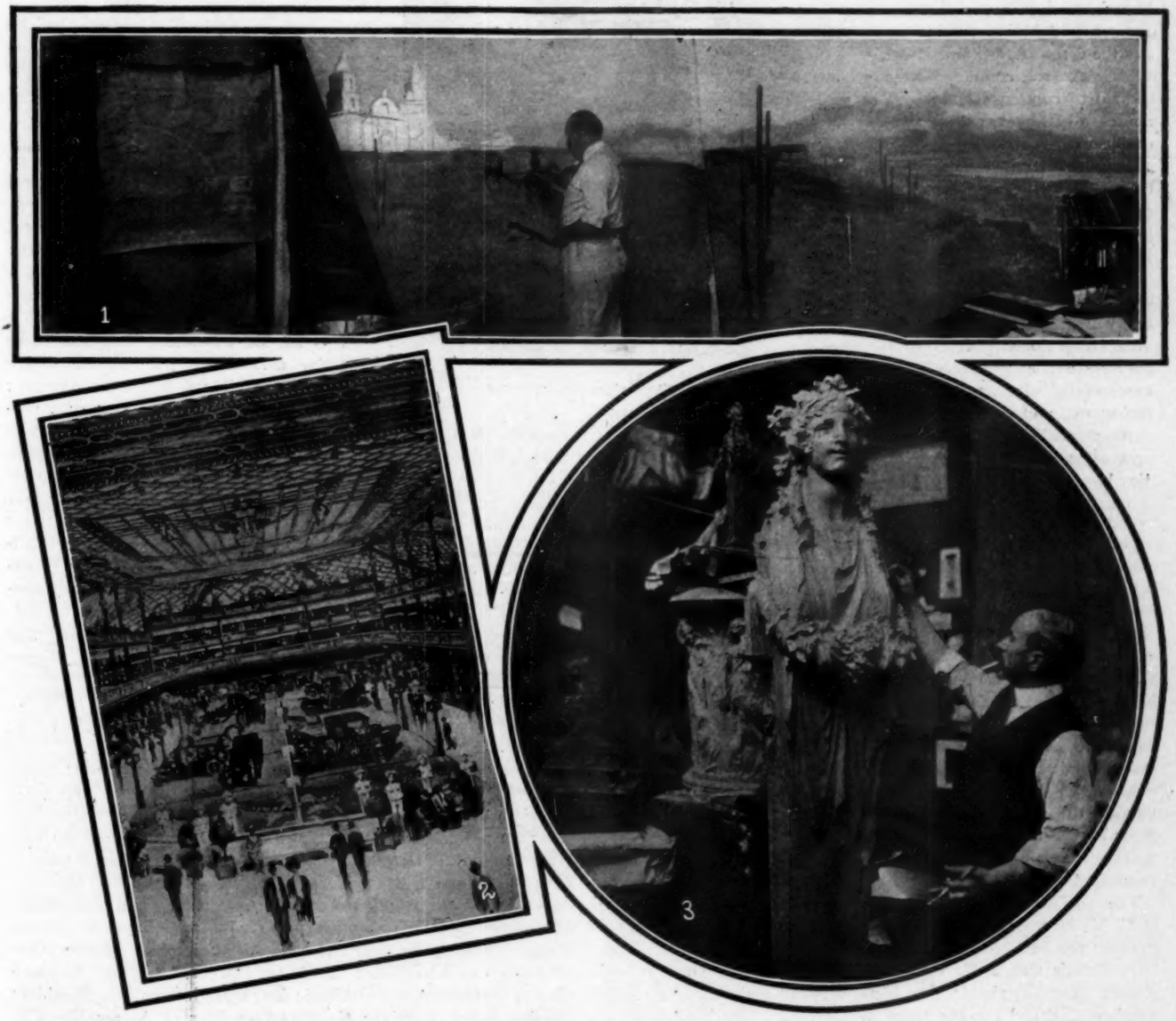
Austria's military budget for 1911, as laid before the delegations in Buda-Pest, embraced estimates for supplying the entire Austrian army with automobiles as a means of transport. Already the system has been made a certainty in some quarters, and it will not be a great while before the entire sixteen army corps of the Austria-Hungary forces will be traveling, whenever occasion demands, in automobiles. This decision was arrived at by the War Office at the close of a series of severe and exhaustive try-outs in Vienna and Buda-Pest, the trials having involved the use of automobiles with a carrying capacity of loads weighing from four to eight tons. After a considerable number of tests it was found that loads of this capacity were too heavy to be dragged over the country roads, bridges, the drains in the towns and the underground conduits. The War Office has finally adopted an automobile of two tons carrying capacity.

THE LOOKING-GLASS AS AN ACCIDENT PREVENTER—The authorities in Colchester, Essex, England, have inaugurated an odd custom by erecting huge mirrors at road junctions, with a view to reducing chances of accidents between automobiles coming from opposite directions. The mirrors are arranged at such an angle that drivers of motor cars and other vehicles are able to see any sort of an equipage coming around the corner.



Had automobiles been in vogue 50 years ago Sheridan's "20 miles away" could have been covered in almost as many minutes and the Union rout checked much earlier

All Motordom Awaits the Shows



1—Jean Paleologue, famous French artist, painting scene of Lower California for Garden decoration. 2—Center section of Garden, showing decorative scheme. 3—Philip Martini executing plaster creations for Garden Show

INTEREST in the approaching season of shows is the most potent force in the automobile world just at present. Touring is done for the time being, at least, as far as it is of national importance; sporting events are now history and even the excellent buying that has been noted throughout the fall has slackened perceptibly in anticipation of the new lines and new ideas that will be presented at the shows.

In some ways the decorative scheme that will be carried out at Madison Square Garden will be more wonderful than ever before. The formal lines of the Egyptian school will be followed, but in the coloring there will be more than a tinge of the oriental. The mural decorations will be exceedingly elaborate, the center piece being a California sunset. Martini, the celebrated sculptor, is in charge of the statuary designing.

The color plan of crimson and gold will lend itself in rich and striking ways to the general effect. With a big force at work on the preliminaries and a regiment of men waiting for the word to tear out the unnecessary portions of the interior of the building and replace them with the steel framework required, the big building can be quickly metamorphosed from a bicycle track and converted for the last time into the stage-setting for a great automobile show.

The bicycle racers hold forth there for the rest of the week but after the close of the races there is nothing of great importance scheduled before the show.

To an even greater extent than usual will the racing drivers be featured at the last Garden show. Mulford, Grant, Disbrow, Aitken, Wilcox, Harroun, Dawson, Patschke, Belcher, De Palma, Basle, Jagersberger and numerous other well-known racing pilots will be on hand to sell cars they have driven.

Over at the Palace final preparations are being pushed forward rapidly. Special emphasis will be laid on the commercial vehicles. A most interesting tabulation has been compiled by the management to show that trucks and delivery wagons propelled by gasoline engines are being used by 200 different branches of industry.

A vast invitation list is being prepared for the N. A. A. M. and Board of Trade shows. In the commercial car section it is said to contain from 80,000 to 100,000 names, all users or prospective purchasers of business vehicles.

An interesting tabulation is the one that deals with the classification of the cards left by visitors at the Garden show last winter and during the commercial week at Chicago. These cards number 3,300 and show that the visitors who left them belong to 53 general lines of industry which were purposely left broad in order to include them all. Of these the building and contracting branch was best represented with 247; metal manufacturing 194, and ranging down from there to flour milling, which was represented by 11 visitors. The professions were not considered in making up the list.

The Palace Show Poster

Importers' Salon Will Show 17 Foreign Cars

Seventeen different makes of foreign-built automobiles will be exhibited at the Importers' Automobile Salon, which is to be held in the Grand Ball Room of the Hotel Astor, New York, from January 2 to 10. Included in this number are, with one exception, every well-known foreign car which has achieved distinction either here or abroad. S. Kjeldsen, who managed the Salon last year and made it such a pronounced success, is at the helm again this season.

The forthcoming exhibition will be strictly a drawing room affair and not an industrial show. Commercial vehicles are excluded and a leading feature will be the magnificent bodies, mounted on the various cars which will exemplify the latest productions of the famous coachbuilders of Europe and America. Four of the latter, by the way, will have separate exhibits.

Over 20,000 square feet of floor space is available in the ballroom and the decorations are superb.

The various makes of automobiles to be exhibited are the C. G. V., Darracq, De Dion Bouton, Panhard and Renault from France; the Benz, Mercedes and Opel from Germany; the Isotta, Itala, Lansia and S. P. A. from Italy; the English Daimler and Napier from England; the Metallurgique and Minerva from Belgium, and the Pic-Pic from Switzerland. The body builders exhibiting are Demarest & Co., the Holbrook Co. and Quinby & Co.

Philadelphia Show Spaces Allotted

PHILADELPHIA, Dec. 9—The results of the drawings for space at Philadelphia's eleventh annual automobile show were announced yesterday, showing that 43 dealers will be represented during the initial week, with a total of more than 50 different makes of pleasure cars. Of this number, according to present plans at least, 22 companies will be allotted space at the Third Regiment Armory, Broad and Wharton streets, and 21 at the First Regiment's building, Broad and Callowhill streets. In all 35,000 square feet of floor space will be utilized to accommodate applicants and present indications point to close quarters for some of the would-be exhibitors. For example, a nearly equal division of space in each armory was made for the gasoline pleasure cars, the First Regiment structure containing 16,500 square feet, all of which will be for these cars, while 15,500 square feet will be devoted to the same purpose in the Third Regiment Armory. The latter building is the larger of the two, containing 18,500 square feet, but 3,000 square feet has been set aside for the accessories exhibit, the drawings for which will be conducted next week. As the space is necessarily limited, the demand is expected to far exceed the accommodations for the display of the many little necessary adjuncts to safety and comfort.

The same difficulty, in an aggravated form, confronts the show committee of the Philadelphia Automobile Trade Association regarding the awarding of space for the exhibition of electrics and commercial vehicles during the second week, the truck show in particular promising to gobble up all the available space—and more.

The list of exhibitors assigned space and the cars which they handle shows the following: Third Regiment Armory: General Motor Car Co., Lozier; Automobile Sales Corporation, Peerless & Cadillac; North Philadelphia Automobile Station, Knox; Winton Motor Carriage Co., Winton; Gomery-Schwartz Motor Car Co., Hudson; Oldsmobile Co. of Pennsylvania, Oldsmobile; Packard Motor Car Co., Packard; Paxton-Crumley Automobile Co., Warren-Detroit; L. J. Bergdoll Motor Co., Bergdoll; Automobile Co. of Philadelphia, Marmon; Longstreth Motor Car Co., Alco; Foss-Hughes Motor Car Co., Pierce-Arrow; Stoddard-Dayton Automobile Co., Stoddard-Dayton; Fiat Automobile Co., Fiat; Chalmers-Hipple Motor Co., Chalmers; Chadwick Engineering Works, Chadwick; Pope-Hartford Sales Corporation, Pope-Hartford; The White Co., White; Mitchell-Lewis Motor Co., Mitchell; Abbott-Detroit Motor Co., Abbott-Detroit; A. G. Spalding & Brother, Stevens-Duryea; Johnson Motor Car Co., Haynes.

Those exhibiting at the First Regiment are as follows: Gawthrop & Wister, Elmore; Ford Motor Co., Ford; Hupp Corporation, Philadelphia Branch, R. C. H.; Overland Motor Co., Overland; G. H. Gantert, Stearns and Selden; Tioga Auto Co., National and Hupmobile; Locomobile Co. of American, Locomobile; W. Wayne Davis Co., Everitt; E. C. Johnson Co., Reo and American; Continental Motor Car Co., Henry and Speedwell; Studebaker Bros. Co., Studebaker, E-M-F and Flanders; United Motor Philadelphia Co., Maxwell and Columbia; Motors Distributing Co., KisselKar; D. Walter Harper, Cameron; Oakland Co., of Pennsylvania; Oakland; Thos. B. Jeffery Co., Rambler; Stanley Motor Carriage Co., Stanley; Mercer Automobile Co., Mercer; Cartercar Motor Co., Cartercar; Standard Motor Car Co., Velie; Eldredge Co., Garford.

Additional Space Necessary at Detroit

DETROIT, MICH., Dec. 11—With over 50,000 square feet of floor space, the Detroit Automobile Show, January 22 to 27, at Wayne Gardens will be one of the largest local shows in this country. Announcement is made at the office of the D. A. D. A., 501 Bowles building, that an annex will be built to extend across Front street and over a large piece of vacant property on the opposite side of the street. This temporary building will be 108 feet wide and 165 feet long, giving 17,820 square feet of floor space. The Wayne Gardens contain 33,180 square feet. The new building will be well heated and brilliantly lighted and the decorations will be on a par with those in the Wayne Gardens.

The city officials were appealed to for permission to build the annex and without any hesitation agreed unanimously, believ-

ing that Detroit should rank with the other cities of the country in its show and that by allowing the closing of Front street they will be giving their assistance in the matter.

The new building will be of single story construction. It will have side windows, giving ample light in the day time. At night it will be brilliantly lighted by electric arc lamps.

Coming, as it does, between the New York shows and the Chicago National Show, Detroit's automobile exhibit holds a strong strategic position in the circuit of American shows. Many Detroit exhibitors who have articles to show are unable to prepare themselves for the opening exhibit at New York and their wares are first seen in the Detroit exhibition. Throughout the country, dealers and agents generally are looking to Detroit for new cars, for new trucks, and for new accessories and, in being able to view a general exhibit in Detroit of the industries of the city and at the same time visit the manufacturers of this city, they find the Detroit show of much practical value.

Syracuse Show to Follow Boston's

SYRACUSE, N. Y., Dec. 11—In the State Armory the Syracuse Automobile Dealers' Association has been utilizing at its annual winter exhibitions 25,000 square feet of space, besides additional space in adjacent buildings. This question of space has become a serious one, as the association could readily use 50,000 square feet, were that space available. The association is hoping that public-spirited citizens will erect a building ample enough for future purposes of the association and for similar events.

At a meeting of the association held this week the date set for the fourth annual Syracuse Automobile Show was March 12 to 16, inclusive, immediately following the Boston show. Already the whole of the exhibition space has been practically spoken for by dealers, and many must inevitably be disappointed. Special attention will be paid to the decorations and musical program, and, coming as it does immediately following the close of the Boston show, it will be possible to secure many of the special show exhibits sent out by the various manufacturers. A special express train will probably be secured to bring selected Boston exhibits here.

The officers of the association are: C. Arthur Benjamin, Packard representative, president; M. W. Kerr, Everitt, vice-president; John R. Valentine, Chalmers, treasurer; W. R. Marshall, secretary and show manager; directors, Sam Silverman, Jr., Ford; George H. Norris, Cadillac; W. R. Shaw, Reo. The office and headquarters of the association are in the Onondaga Hotel. Mr. Shaw, of the Reo agency, assumed a director's post to replace E. P. Horton, of The United Motors Company, who has removed to Atlanta, Ga.

Cincinnati Show in Music Hall

CINCINNATI, O., Dec. 11—The Retail Dealers' Association annual show committee reports that applications for space are coming in more rapidly than was expected and that additional features looking to the entertainment of the guests of the association from out of town are now contemplated, including a concert program with vocal selections by artists of national repute. The past shows are to be eclipsed by the event of the week of Washington's birthday and the fact that the association is so fortunate as to have the great Cincinnati Music Hall this year for show purposes has stimulated the committee to make the event one of great social importance as well as an exposition of the progress of the motor world in the central states. Commercial vehicle manufacturers are coming to the front with applications on account of the importance given this class of automobiles by the dealers' committee in arranging special show dates following the pleasure vehicle show and many more types of this class of cars will be shown here this year than ever before.

The Cincinnati show management will, as usual, give much attention to the setting of displays and has secured the highest authority obtainable as regard the artistic and floral features of the coming show.

Canadian National Shows Progressing

Judging by the applications received, great interest is being shown by manufacturers of automobiles in the two Canadian national automobile shows to be held in Montreal and Toronto, on dates February 3 to 10, and February 21 to 28, respectively.

Manager E. M. Wilcox, 123 Bay St., Toronto, states that almost every American car seems to be now represented in Canada, and there will undoubtedly be a large increase in the exports of automobiles from the United States to Canada in 1912, although the increase last year was almost double that of the year before. The Armory has been secured from the Dominion Government for the Toronto show and the Drill Hall for the Montreal show.

International Rubber Show in 1912

Sir Henry Blake, G. C. M. G., will act as presiding officer of the first International Rubber Exposition to be held in the United States and which is scheduled for September, 1912. Practically every important rubber industry in the world will be represented and the scope of the exposition may be judged from the fact that over seventy leading men connected with various branches of the industry in foreign lands have accepted committee assignments for important work before and during the exposition. The show will be staged in the new Grand Central Palace under the management of the International Exposition Co. of which Samuel A. Miles is a director.

Atlanta May Promote a Show

ATLANTA, GA., Dec. 9—The Atlanta Automobile and Accessory Association has started two campaigns which should result in the organization of a state association of automobilists and a dealers' show in Atlanta.

A series of meetings has been held with a view of working up interest in the much-needed state association. The most recent one was on Monday, December 11.

Committees are now working through the field to find out the prospects for a successful dealers' show. Atlanta has an ideal place for such an exhibition in the Auditorium-Armory, where the first Southern show under national auspices was held.

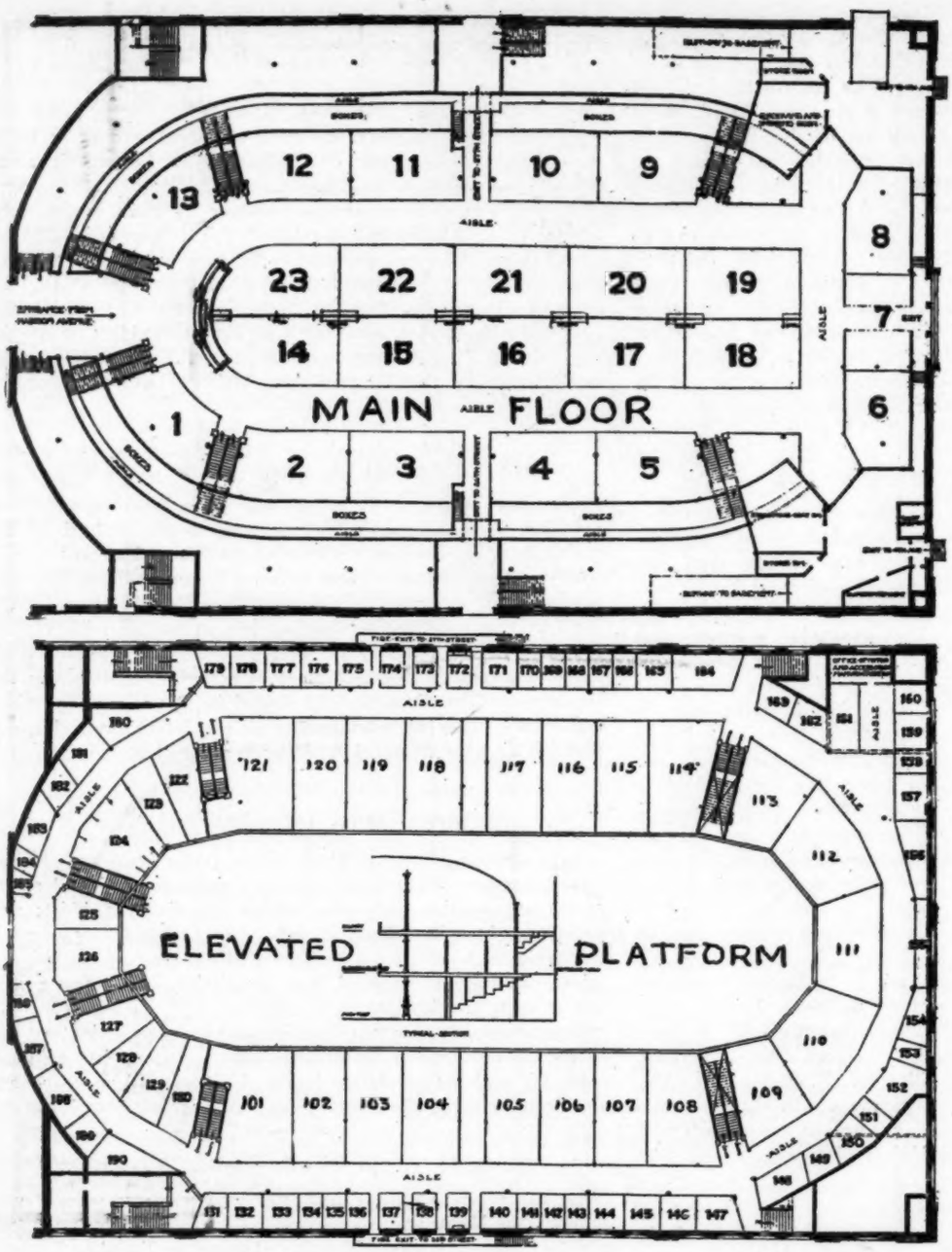
M. and A. M. Show Week Meetings

In connection with the activities of the show season next January the Motor and Accessory Manufacturers have announced the following meetings: Executive Committee, Tuesday, January 9, at 10 a. m., at the association's offices, 17 West Forty-second street; Board of Directors, same day and place at 11 a. m.; Banquet Committee, immediately following that of the Board of Directors; ninth annual meeting, Wednesday, January 10 at 10.30 a. m., at the Waldorf-Astoria; annual banquet, grand ballroom, Waldorf-Astoria, Thursday, January 11, at 7 p. m.

Rochester Space All Disposed Of

ROCHESTER, N. Y., Dec. 11—The annual show of the Rochester Automobile Dealers' Association, will this year for the first time be held in the State Armory, one of the largest exhibition display spaces in the State.

The committee in charge is as follows: F. W. Peck, chairman; J. C. Dryer, secretary; W. C. Barry, Jr., A. F. Crittenden, C. E. Hartson, A. R. McKenney, S. C. Babcock, F. R. Luescher, C. E. Sager, G. F. Bauer, Arthur McNall, A. V. Hart and D. F. Garber. Colonel C. A. Simmons, assistant adjutant-general of the state, who managed Rochester's show two years ago, will be in charge.



Exhibitors' List

PLEASURE VEHICLES.

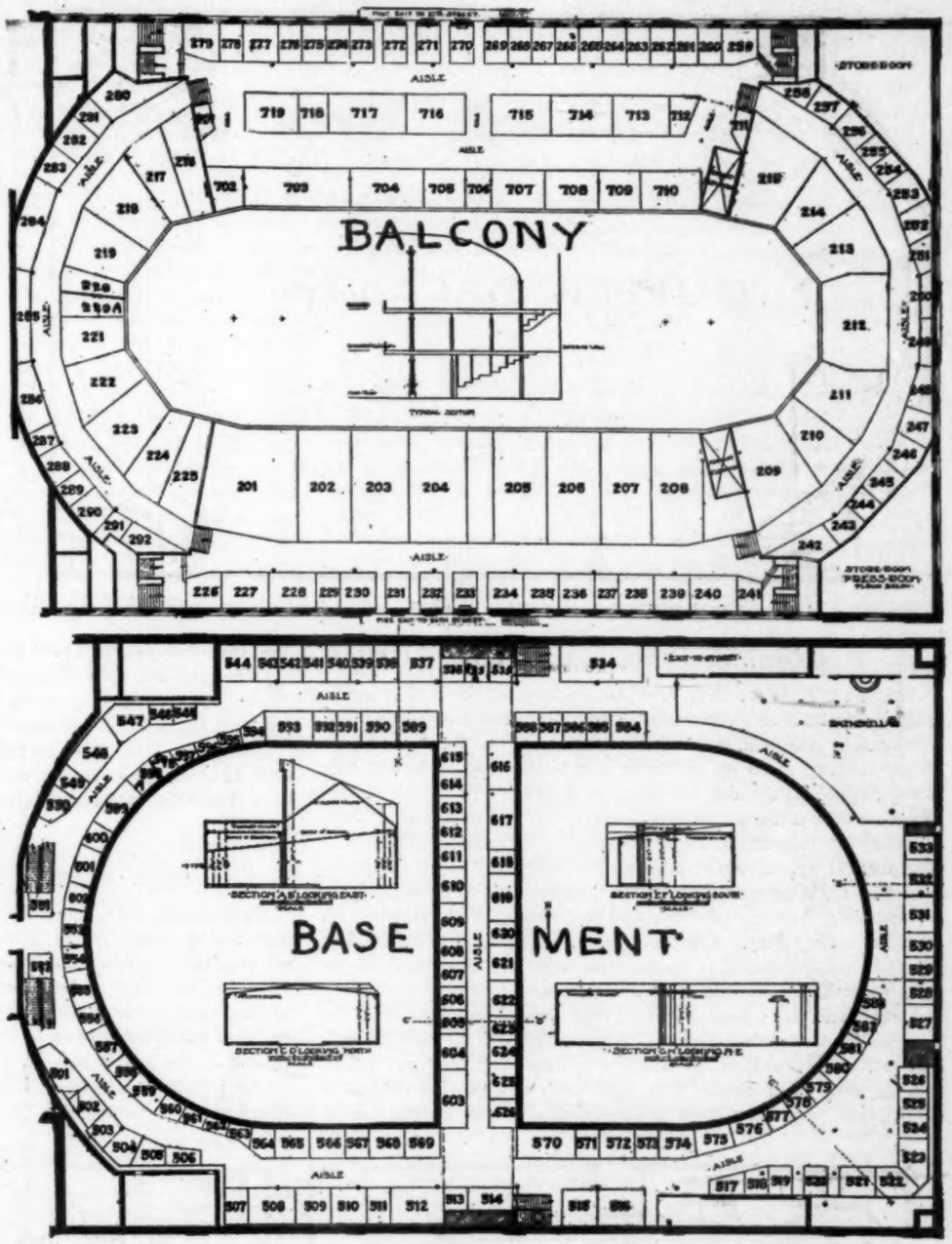
Space No.	
103	American Locomotive Co.
106	American Motors Co.
214	Anderson Electric Car Co
207	Atlas Motor Car Co.
213	Baker Motor Vehicle Co.
112	Brush Runabout Co.
14	Buick Motor Co.
16	Cadillac Motor Car Co.
55	Cartercar Co.
21	Chalmers Motor Co.
110	Columbia Motor Car Co.
117	Corbin Motor Vehicle Corp
3	Dayton Motor Car Co.
105	Elmore Mfg. Co.
23	E. M. F. Company.
212	Flanders Mfg. Co.
8	Franklin Mfg. Co., H. H.
201	The Garford Co.
114	Haynes Automobile Co.
20	Hudson Motor Car Co.
50	Inter-State Automobile Co.
111	Jackson Automobile Co.
121	Knox Automobile Co.
10	Locomobile Co. of America.
7	Lozier Motor Co.
208	W. H. McIntyre Co.
204	Marquette Motor Co.
120	Matheson Automobile Co.
18	Maxwell-Briscoe Motor Co.
52	Mercer Automobile Co.
104	Metzger Motor Car Co.
12	Mitchell-Lewis Motor Co.
107	Moline Automobile Co.
118	Moon Motor Car Co.
119	National Motor Vehicle Co.
101	Nordyke & Marmon Co.
4	Oakland Motor Car Co.
202	Ohio Motor Car Co.
1	Olds Motor Works.
17	Packard Motor Car Co.
205	Palmer & Singer Mfg. Co.
11	Peerless Motor Car Co.
19	Pierce-Arrow Motor Car Co.
54	Pierce Motor Co.
5	Pope Mfg. Co.
108	Premier Motor Mfg. Co.
116	Pullman Motor Car Co.
22	Reo Motor Car Co.
109	Selden Motor Vehicle Co.
209	S. G. V. Co.
53	Simplex Automobile Co.
51	Simplex Motor Car Co.
203	Speedwell Motor Car Co.
6	F. B. Stearns Co.
13	Stevens-Duryea Co.
102	E. R. Thomas Motor Car Co.
215	The Waverly Co.
2	The White Company.
15	Willys-Overland Co.
9	Winton Motor Carriage Co

ACCESSORIES.

Space No.	
157	Ajax-Grieb Rubber Co.
*603	Ajax Trunk & Sample Case Co.
*526	The J. Alexander Mfg. Co.
*314	Allen Auto Specialty Co.
*178	American Ball Bearing Co.
*503	The American Bronze Co.
*258	American Circular Loom Co.
506	American Oil Pump & Tank Co.
*519	American Rim Co.
423	American Taximeter Co.
541	American Vanadium Co.
502	The Aristos Co.
551	James R. Ashley.
566	Atlas Chain Company.
140	Atwater Kent Mfg. Wks.
*281	Auburn Auto Pump Co.
594	Automobile Journal Pub. Co.
*422	Auto Specialty Co.
245	Automobile Supply Mfg. Co.
*573	Auto Wind Shield Co.
*595	The A-Z Co.
125	The Badger Brass Mfg. Co.
136	Baldwin Chain & Mfg. Co.
586	Bantam Anti-Friction Co.
555	C. B. Barker & Co., Ltd.
587	Barthel, Daly & Miller.
*309	Batavia Rubber Co.
*577	Baum's Castorine Co.
249	Benford Mfg. Co.
*402	Best Ignition Equip. Co.
*533	John W. Blackledge Mfg. Co.
*292	Booth Demountable Rim Co.
218	Bosch Magneto Company.
253	Bower Roller Bearing Co.
190	S. F. Bowser & Co., Inc.
*261	Briggs & Stratton Co.
186	Briscoe Mfg. Co.
*611	Brown Co.
169	Brown-Lipe Gear Co.
255	Buda Company.
174	Byrne Kingston & Co.
*607	Calmon Asbestos & Rubber Works.
544	Carnegie Steel Co.
*531	F. S. Carr Co.
244	Champion Ignition Co.
184	The Chandler Co.
241	Chicago Telephone Co.
600	Chilton Co.
546	Class Journal Co. (Automobile).
545	Class Journal Co. (Motor Age).
*605	Clucker & Hixson Co.
*563	C. M. B. Wrench Co.
155	Coes Wrench Co.
217	Columbia Lubricants Co.
185	Columbia Nut & Bolt Co., Inc.
154	Conn. Tel. & Electric Co.
152	Consolidated Rub. Tire Co.
*277	Continental Rubber Works.
*266	Adam Cooks Sons.
220	Covert Motor Vehicle Co.
*265	C. Cowles & Co.
*510	Cox Brass Mfg. Co.
187	Wm. Cramp & Sons Ship & Eng. Bldg. Co.
592	C. J. Cross & Co.
*572	Frank H. Cross Co.
240	Crucible Steel Co. of Amer.
*569	Smalley Daniels.
*516	The Dayton Engineering Laboratories Co.
243	The Dean Electric Co.
313A	Detroit Elec. Appliance Co.
250	Detroit Lubricator Co.
138	Diamond Chain & Mfg. Co.
127	Diamond Rubber Co.
182	Joseph Dixon Crucible Co.
*310	Doehler Die Casting Co.
*608	Donnelly Motor Equip. Co.
233	Dorian Remountable Rim Co.
*287	Dover Stamping & Mfg. Co.
*317	Double-Fabric Tire Co.
260	Driggs-Seabury Ordnance Corp.
*404	Duplex Magneto & Spark Plug Co.
*606	John L. G. Dykes Co.
*248	The Eagle Co.
602	J. Eavenson & Sons, Inc.
237	Edison Storage Battery Co.
181	The Edmunds & Jones Co.
216	Eisemann Magneto Co.
*578	El Arco Radiator Co.
183	Electric Storage Battery Co.
*576	H. A. Elliott.
*413	Endurance Tire & Rub. Co.
159	English & Mersick Co.
*518	Essex Rubber Co., Inc.
*304	Esterline Company.
*417	E. Z. Way Motor Grease Co.
*515	Fedders Mfg. Co.
222	Federal Rubber Mfg. Co.
559	Findeisen & Kropf Mfg. Co.
164	Firestone Tire & Rub. Co.
122	The Fisk Rubber Co.
406	L. V. Flechter & Co.
*609	Ernst Flentje.
*589	H. H. Franklin Mfg. Co. (Die Casting Department).
540	Peter A. Frasse & Co.
*274	Gabriel Horn Mfg. Co.
*604	Garage Equipment Mfg. Co.
*529	Gardner Engine Starter Co.
*612	Geiszler Bros. Stge. Bat. Co.
307	Gemmer Mfg. Company.
320	General Electric Company.
501	James L. Gibney & Bro.
*273	The Gilbert Mfg. Co.
561	M. S. Gilmer.
*271	The Globe Machine & Stamping Co.
126	The B. F. Goodrich Co.
130	Goodyear Tire & Rubber Co.
427	Gould Storage Battery Co.
129	Gray & Davis.
*267	Gray-Hawley Mfg. Co.
*524	The Gray Specialty Co.
*626	Emil Grossman Company.
*564	The Hall-Thompson Co.
*525	Hardman Tire & Rubber Co.

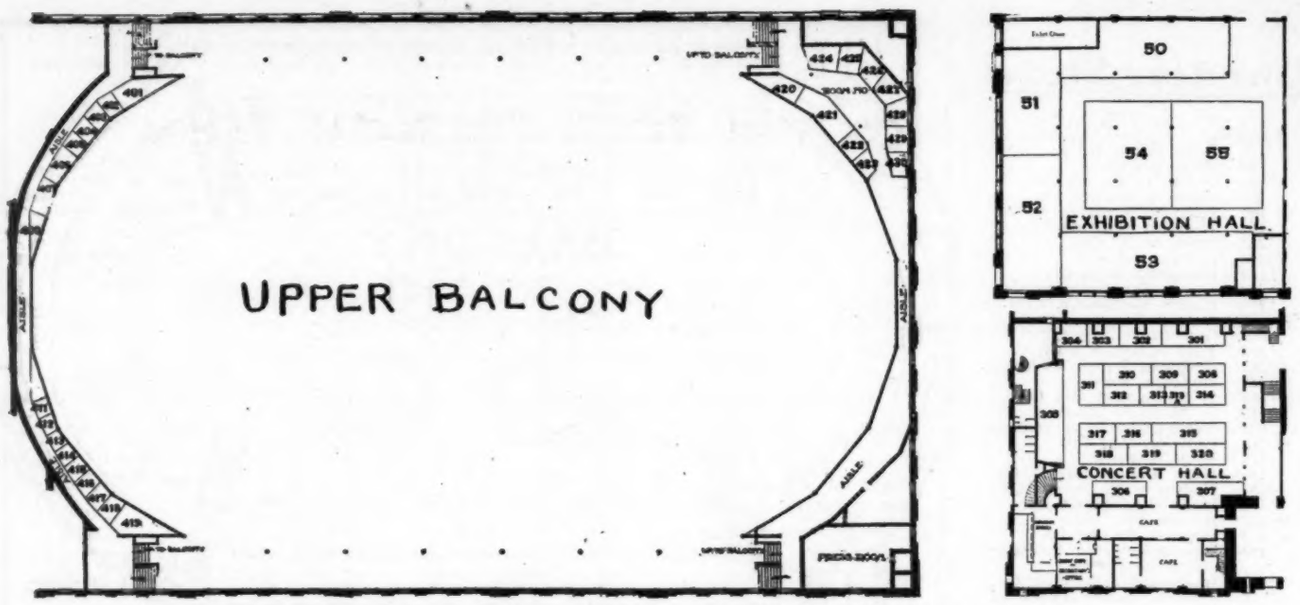
* Indicates will exhibit in Part I only; ** in Part II only. No asterisk indicates will exhibit in Parts I and II.

at Garden Show



Space No.		Space No.		Space No.	
*528	F. A. Hardy & Co.	148	Republic Rubber Co.	*582	Standard Tire & Rubber Co.
134	R. E. Hardy Co.	543	Rhineland Mch. Works Co.	*527	Standard Tire Protector Co.
162	A. W. Harris Oil Co.	*424	P. Rielly & Son.	177	Standard Welding Co.
220A	Harrison Radiator Co.	*623	Riley-Klotz Mfg. Co.	*583	John T. Stanley.
160	Hartford Mech. Screw Co.	*615	R. I. V. Co.	*405	Star Speedometer Co.
156	Hartford Suspension Co.	*279	Rose Manufacturing Co.	306	Start-Lite Co.
232	Havoline Oil Co.	**314	Ross Gear & Tool Co.	*571	Culver Stearns Mfg. Co.
*282	George A. Haws.	238	Royal Equipment Co.	*286	Stein Double Cushion Tire Co.
*579	Hawthorne Mfg. Co.	*285	Rushmore Dynamo Works.	*619	Stevens & Co.
*219	Hayes Manufacturing Co.	290	Russian Tire Co.	227	Stewart & Clark Mfg. Co.
*270	Heinze Electric Co.	*269	J. H. Sager Co.	235	Stromberg Mot. Devices Co.
*259	Herz & Co.	535	S. & S. Shock Absorber Co.	254	Stutz Auto Parts Co.
305	Hess-Bright Mfg. Co.	*614	S. B. R. Specialty Co.	171	Swinehart Tire & Rub. Co.
*302	Hess Spring & Axle Co.	*275	Seamless Rubber Co.	246	Texas Company.
*262	Hodgman Rubber Company.	*264	C. A. Shaler Co.	538	And. C. Thompson Auto Co.
189	Hoffecker Co.	*512	Shawmut Tire Co.	166	Timken Detroit Axle Co.
588	S. Hoffnung & Co., Ltd.	534	Sheldon Axle Co.	165	Timken Roller Bearing Co.
*622	R. M. Hollingshead Co.	557	Simonds Mfg. Co.	*407	Chas. O. Tingley & Co.
601	Homo Company of America.	504	S. K. F. Ball Bearing Co.	**313	Torbenson Gear and Axle Co.
597	Horseless Age Co.	149	A. O. Smith Co.	536	Joseph Tracy.
418	H. J. Houpert.	*429	Grant E. Smith.	230	Treadwell Engineering Co.
131	Hyatt Roller Bearing Co.	535A	Smith Gasoline Meter Co.	*508	Troy Carriage Sun Shade Co.
*509	Hydraulic Oil Storage Co.	554	Sonora Motor Horn Co.	*620	Tryon Auto Pump Co.
*575	Ideal Wind Shield Co.	*521	L. Sonneborn Sons, Inc.	*511	Chas. H. Tucker Co.
549	Ignition Co.	*312	F. W. Spacke Machine Co.	*523	Tucker Tool & Machine Co.
558	Imperial Bearing Co.	308	Sparks-Withington Co.	158	Turner Brass Works.
257	International Acheson Graphite Co.	*584	Sphink Motor Co.	*414	Typhoon Signal Co.
*513	Internat. Metal Polish Co.	168	Spicer Mfg. Co.	*610	Union Auto Specialties Co.
*318	Jackson Church Wilcox Co.	128	C. F. Splitdorf.	315	United Rim Co.
252	Jacobson Brandow Co.	*301	Sprague Umbrella Co.	*532	U. S. Auto Horn Co.
173	Janney, Steinmetz & Co.	*224	Springfield Metal Body Co.	144	U. S. Light & Heat Co.
*567	Jeffery-Dewitt Co.	163	Standard Roller Bearing Co.	124	United States Tire Co.
547	J. M. Shock Absorber Co.	247	Standard Thermometer Co.	*507	United Steel Co.
284	Isaac G. Johnson & Co.			**309	United Steel Co.
137	Phineas Jones & Co.			188	Vacuum Oil Co.
143	Jones Speedometer.			*272	Valentine & Company.
*291	Kellogg Mfg. Co.			311	Vanadium Metals Company.
**564	W. J. Kells Mfg. Co.			409	Van Auken Indicator Co.
598	Keystone Lubricating Co.			*625	Vanguard Mfg. Co.
*613	K. W. Ignition Co.			123	Veeder Mfg. Co.
*428	Wm. R. Laidlaw, Jr.			*412	Velox Polish Mfg. Co.
231	Leather Tire Goods Co.			*268	Vesta Accumulator Co.
225	Lee Tire & Rubber Co.			*303	Voorhees Rubber Mfg. Co.
590	Lefever Arms Co.			*580	Warburg Rim Co.
133	Light Mfg. & Foundry Co.			*574	Ward Leonard Elect. Co.
229	Link Belt Company.			176	Warner Gear Co.
226	Lovell-McConnell Mfg. Co.			150	Warner Instrument Co.
151	McCord Mfg. Company.			236	Warner Mfg. Co.
*280	McCue Company.			430	Wasson Piston Ring Co.
552	F. T. McGinnis.			550	Wayne Oil Tank & Pump Co.
*276	Manufacturers Foundry Co.			142	Weed Chain Tire Grip Co.
537	Marburg Brothers, Inc.			*530	Westen Mfg. Co.
553	The Mead Engine Company.			170	Weston Mott Co.
548	Merchant & Evans & Co.			*289	Western Tool & Forge Co.
*421	Metal Stamping Co.			145	Wheeler & Schebler.
*520	Meteor Auto Tank Co.			*288	White & Bagley Co.
135	C. A. Mezger, Inc.			179	The Whitney Mfg. Co.
228	Michelin Tire Company.			*283	Willard Storage Battery Co.
161	Chas. E. Miller.			*420	C. A. Willey Co.
*618	Wm. P. Miller's Sons.			175	J. H. Williams & Co.
562	Modern Auto Appliance Co.			*425	Wm. R. Winn.
*565	Morrison-Ricker Mfg. Co.			*313	Wolverine Lubricants Co
180	A. R. Mosler & Co.			153	O. W. Young.
*581	Frank Mossberg Co.				
*556	Motor.				
*617	Motor Car Equipment Co.				
*560	Motor Vehicle Pub. Co.				
505	Motor World Publishing Co.				
234	Motz Tire & Rubber Co.				
239	Muncie Gear Works.				
*616	L. J. Mutty Co.				
598A	Mutual Auto Accessories Co.				
411	Narragansett Chemical Co.				
*415	Geo. Nash Co.				
*621	Nathan Novelty Mfg. Co.				
132	National Carbon Co.				
*263	National Coil Co.				
*242	National Rubber Co.				
139	National Tube Co.				
223	New Departure Mfg. Co.				
*426	N. J. Car Spring & Rub. Co.				
539	Newmastic Tire Co.				
591	The New Miller Mfg. Co.				
*624	New York Coil Co.				
141	N. Y. & N. J. Lub. Co.				
251	New York Sptg. Goods Co.				
561	New York U-Ray Sales Co.				
585	Niagara Lead & Battery Co.				
*278	Noera Manufacturing Co.				
*514.	A. S. Noonon Tool & Mach. Works.				
*517	North East Electric Co.				
*319	Northway Motor & Mfg. Co.				
172	Oliver Mfg. Co.				
*221	Pantasote Co.				
416	Paragon Auto Parts Mfg. Co.				
147	Pennsylvania Rubber Co.				
542	The Perfection Spring Co.				
403	Perfect Window Reg. Co.				
**565	Philadelphia Stge. Bat. Co.				
*316	G. Piel Company.				
167	Pittsfield Spark Coil Co.				
*568	Polson Manufacturing Co.				
**556	Power Wagon Pub. Co.				
*570	Prince Tire Co.				
599	Thos. Prosser & Son.				
146	Remy Electric Co.				

* Indicates will exhibit in Part I only; ** in Part II only. No asterisk indicates will exhibit in Parts I and II.



Showing arrangement of spaces in Madison Square Garden, upper balcony, Exhibition Hall and Concert Hall

News of Other Local Shows

MILWAUKEE, WIS., Dec. 11—The opening night of the fourth annual Milwaukee automobile show under the auspices of the Milwaukee Automobile Dealers' Association in the Auditorium from January 13 to 19, inclusive, will be Milwaukee Automobile Club Night and the 600 members of the club will be the special guests of the dealers. Sunday, January 14, will be Owners' Day; January 15, Interurban Day; January 17, Merchants' and Manufacturers' Day, on which commercial vehicles will be featured; January 18, Wisconsin Automobile Dealers' and Wisconsin State Automobile Association Day, and the closing day, January 19, will be Society Day. The motor club, which conducted the first two Milwaukee shows, is co-operating with the Dealers' Association to make the fourth show a huge success.

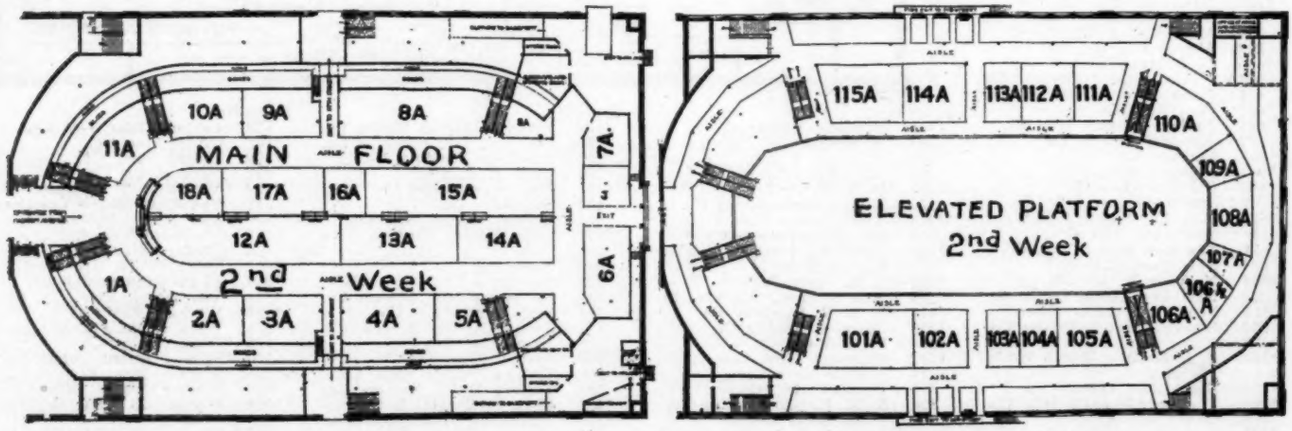
LOUISVILLE, KY., Dec. 11—The fifth annual exhibition of the Louisville Automobile Dealers' Association will be held February 21, 22, 23 and 24 in the First Regiment Armory, which covers more floor space, it is said, than any other building in the South. The 1912 show is scheduled a month earlier than it was held last year. The committees in charge of the exhibition in 1911 did their work so well that they have again been chosen to make arrangements for the coming show, and look after all the details connected with the displays.

TIFFIN, O., Dec. 11—The dates for the second annual *Advertiser* Auto Show, under the auspices of a local organization have been definitely fixed for March 6 to 9 inclusive. Space is now available.

Prof. Warren S. Johnson Dead

MILWAUKEE, WIS., Dec. 11—Prof. Warren S. Johnson, president and treasurer of the Johnson Service Co., one of the largest builders of pleasure and commercial cars at Milwaukee. Wis., who died at Los Angeles, Cal., on December 5, after an illness of two years, was a noted inventor and designer and probably the first man to propose and execute the idea of using the motor vehicle in the postal service.

The funeral was held at Los Angeles on December 7 and the remains were cremated, at Prof. Johnson's request.



How the commercial exhibitors at the Garden will be installed during the second week of the show

Space No.		Space No.		Space No.		Space No.	
11A	American Locomotive Co.	4A	The Garford Co.	16A	Lozier Motor Co.	18A	Pope Mfg. Co.
106A	Anderson Electric Car Co.	8A	General Motors Truck Co.	102A	W. H. McIntyre Co.	113A	Reo Motor Car Co.
6A	The Autocar Company.	110A	General Motors Truck Co.	15A	Mack Bros. Motor Car Co.	17A	Alden Sampson Mfg. Co.
109A	Baker Motor Vehicle Co.	111A	General Vehicle Co.	14A	Metzger Motor Car Co.	5A	Speedwell Motor Car Co.
106½A	Bronx Electric Vehicle Co.	115A	General Vehicle Co.	105A	Morgan Motor Truck Co.	7A	F. B. Stearns Co.
103A	Brush Runabout Co.	10A	Grabowsky Power Wag. Co.	12A	Packard Motor Car Co.	101A	Studebaker Automobile Co.
114A	Buick Motor Co.	1A	Knox Automobile Co.	9A	Peerless Motor Car Co.	107A	Ward Motor Vehicle Co.
104A	Cartercar Co.	3A	Locomobile Co. of America.	2A	Pierce-Arrow Motor Car Co.	13A	The White Company.

Late General and Trade News

ATLANTA, GA., Dec. 7—The awards in the Tour Around Georgia, which virtually ended in Atlanta, December 2, have just been made public. The reason for the delay was the fact that while most of the cars finished in Atlanta a few machines which joined the tour on the first, second and third days of the run had to go back to their starting points before they completed the circuit and no awards could be made until all had finished and until all the checkers' reports had been mailed to the referee.

The two special prizes offered for consistent running and for sticking most closely to the time card were awarded by Referee Connally. First prize was given to the Velie roadster, entered from the Atlanta Velie branch, while the second prize went to the Flanders team. The hard luck cup, offered by the Atlanta Ad-Men's Club, had previously been awarded, on a vote of the contestants, to W. G. Southerlin whose Overland was continually in hot water.

The other prize winners, the entrant and the amount of prize money received follow:

Class A (Cars Costing $2,500 and Over)

No. 3	Dr. J. C. Luke, Ocila, Ga., Ohio	$108.33
No. 15	T. C. Lauren, Atlanta, Packard	108.33
No. 21	Frank G. Corker, Dublin, Ga., White Gas	108.33
No. 23	Ralph Walker, Atlanta, National	108.33
No. 37	Evelyn Harris, Atlanta, Thomas Flyer	108.33
No. 53	Muchalu Cigar Co., Americus, Ga., Marmon	108.33

Class B (Cars Costing $1,600 to $2,500)

No. 1	Atlanta Ad Men's Club, Imperial	$50
No. 2	Ohio Motor Car Co., Cincinnati, Ohio	50
No. 5	Jake W. Paulk, Ocilla, Ga., Ohio	50
No. 11	Atlanta Chamber of Commerce, Cole 30-40	50
No. 19	Velie Motor Vehicle Co., Atlanta, Velie	50
No. 22	Sam Bashlinski, Dublin, Ga., Chalmers	50
No. 28	U. S. Fuller, Culloden, Ga., Cadillac	50
No. 31	W. A. Ayash, Americus, Ga., Overland	50
No. 36	G. W. Varn, Valdosta, Ga., Cadillac	50
No. 40	F. G. Edwards, Albany, Ga., Chalmers	50
No. 43	W. B. Cummings, Atlanta, Buick	50
No. 46	Gulf Refining Co., Atlanta, Mitchell	50
No. 60	B. T. Bowers, Cannon, Ga., Case	50

Class C (Cars Costing from $1,000 to $1,600)

No. 6	W. E. Sawyer, Americus, Ga., Overland	$130
No. 14	Miss Regina E. Rambo, Marietta, Ga., Overland	130
No. 30	Holmes Bros., Culloden, Ga., Buick	130
No. 42	Steve R. Johnston, Atlanta, Buick	130
No. 56	Trio Laundry, E. H. Wilson, Atlanta, E-M-F	130

Class D (Cars Costing $1,000 or Less)

No. 33	E-M-F Company, Atlanta, G. W. Hanson, Manager, Flanders	$162.50
No. 34	E-M-F Company, Atlanta, G. W. Hanson, Manager, Flanders	162.50
No. 35	E-M-F Company, Atlanta, G. W. Hanson, Manager, Flanders	162.50
No. 48	Georgia Motor Car Company, Atlanta, Liberty Brush	162.50

Traction Company Selling Electric Cars

A new era in motor car selling in Milwaukee, Wis., began on December 1, when the Milwaukee Electric Railway & Light Co., one of the largest and strongest public service corporations in the United States, became selling agent for the Rauch & Lang electric cars. The former agent was the Welch Bros. Motor Car Co., which has sold its Packard business to the Packard Motor Car Co., of Chicago, to enable the Welch brothers to care for their late father's vast estate. The Electric Company, as the M. E. R. & L. Co. is generally known, has as territory the city of Milwaukee, Kenosha, Racine, East Troy, Burlington, Waukesha, Oconomowoc, Watertown and all points reached by its interurban lines, in addition to the contiguous territory. John I. Beggs, former president and general manager of the company and mainly responsible for its remarkable growth and prosperity, purchased a Rauch & Lang electric several years ago, after an extensive study of electric cars, and several of these cars are now used by officials and superintendents of the traction company. Recently the new management of the Electric Company established a large private garage for its numerous light and heavy trucks, including gasoline and electric cars, used for transportation and repairs. The sales department is at the Public Service building, the $2,000,000 terminal of the traction company, and the show rooms at the M. E. R. & L. Co. garage, 451-453 Broadway.

Bay State Association's Annual Banquet

BOSTON, Dec. 11—The annual banquet of the Bay State Automobile Association at the Hotel Somerset this evening was the most successful motor affair of a social nature that has ever taken place in Boston. There were about 250 members and guests present.

At the head table President E. A. Gilmore had the center position and on either side of him were the following guests: Mayor John F. Fitzgerald, of Boston, President George W. Smith, of the Boston Chamber of Commerce, President George A. Coleman, of the Associated Advertising Clubs of America, Ex-Chairman Harold D. Parker, of the Massachusetts Highway Commission, Col. William D. Sohier and Frank D. Kemp, of the Highway Commission, President Lewis R. Speare, of the Massachusetts State Automobile Association, former president of the A. A. A., President John H. MacAlman, of the Boston Automobile Dealers' Association; President C. F. Whitney, of the Boston Commercial Vehicle Dealers Association, Chairman A. G. Batchelder, of the American Automobile Association executive committee, President Alvin E. Bliss, of the Malden Automobile Club, President A. E. Converse, of the Winchendon Automobile Club, President W. H. Chase, of the Leominster Automobile Club, President William N. Appleton, of the Haverhill Automobile Club, President John S. Harrington, of the Worcester Automobile Club and Secretary James Fortesque, of the Massachusetts State A. A., and many others prominent in automobile circles.

President George W. Smith, of the Boston Chamber of Commerce, and President George A. Coleman, of the Associated Advertising Clubs of America were among the speakers of the evening. President Hugh Chalmers, of the Chalmers Motor Car Company, was to have delivered his address upon "Salesmanship," but was prevented by a sudden illness.

Quaker Dealers Elect New Officers

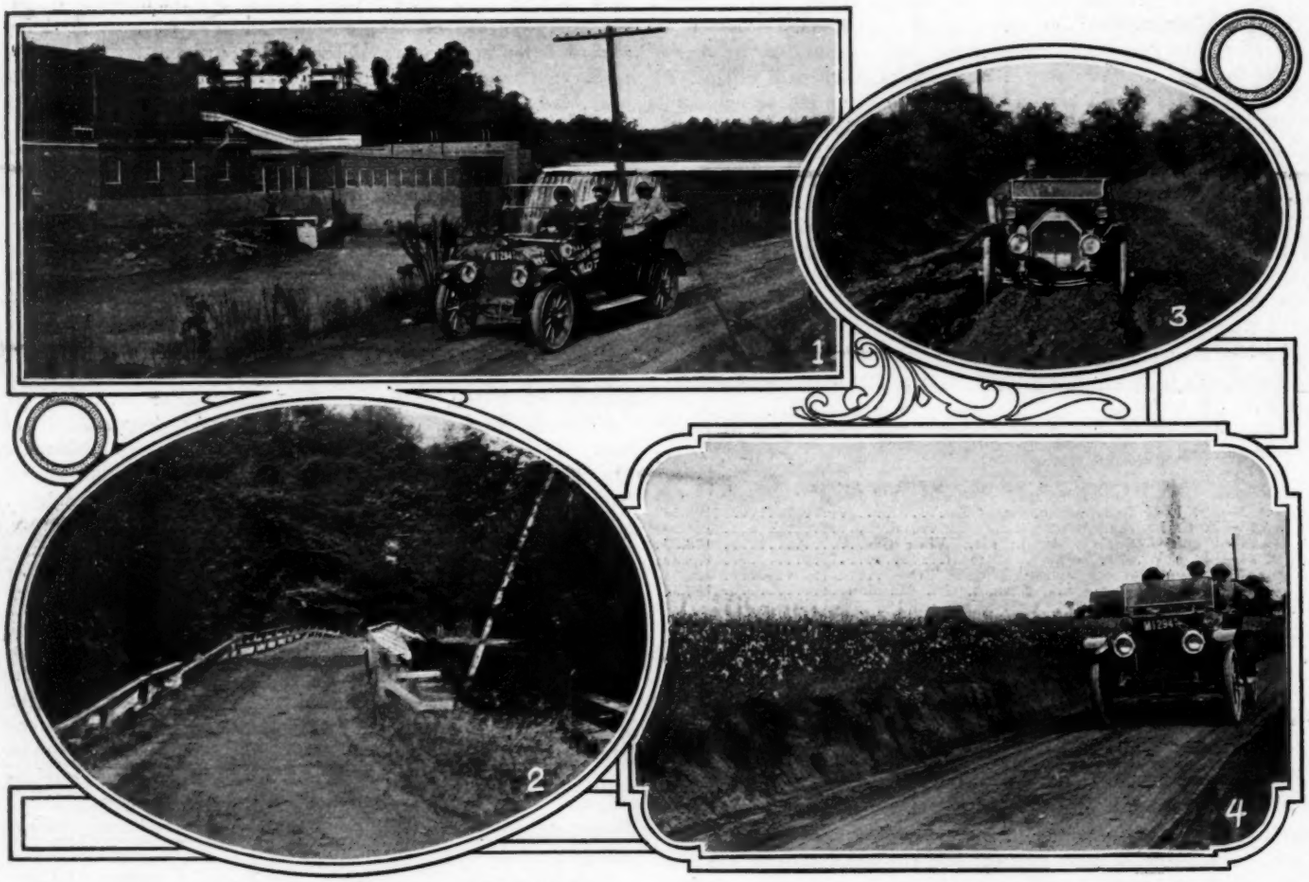
PHILADELPHIA, Dec. 8—At the annual meeting and election of the Philadelphia Automobile Trade Association on Wednesday at the organization's headquarters, southwest corner of Broad and Callowhill streets, the following officers were elected for the ensuing year:

Louis C. Block, manager of the Philadelphia branch of the Ford Motor Company, president; William P. Herbert, of the General Motor Car Company, handling the Lozier car, vice-president, and F. W. Eveland, of the A. G. Spalding & Brother Company, agents for the Stevens-Duryea, re-elected treasurer.

R. M. Cook, manager of the Automobile Sales Corporation (Peerless and Cadillac), and H. H. Coale, sales manager of the Autocar Company, were elected members of the Board of Directors, while W. Wayne Davis, head of the W. Wayne Davis Company (Everitt), and J. C. Bartlett, of the Woods Electric Company, were chosen members of the Committee on Admissions.

All of the new officers of the association are well and favorably known in automobile trade circles, not only in Philadelphia, but throughout the East.

A Jaunt Through South Carolina.



1—Where the Pacolet River is harnessed to turn the cotton mills at Converse
2—Bridge building is no fine art here, but is needed only occasionally
3—The worst spot found in South Carolina and not so very bad after all
4—In the heart of Cotton's kingdom, 7 miles from Greenville

WHEN the Glidden Tour crossed South Carolina a road had been selected for the caravan to follow that touched only the extreme western portion of the state. The topography of South Carolina is level generally, and the nearer one approaches the Atlantic seaboard the flatter and more swampy it is.

Within the state the highway followed was 134.3 miles long, all of which is more or less improved. The country raises cotton as a staple and corn, turpentine and lumber incidentally. The scenery lacks the grandeur of the Virginia hills, but the roads are an improvement over those of the section south of Roanoke.

There was a bumper cotton crop produced in South Carolina this season and part of it was marketed at good prices. However, a majority of the farmers and local dealers and ginners have not learned the use of short sales in the market when cotton is high, and consequently did not take advantage of the high level of prices that prevailed for a part of this season.

As a result, wherever in the South cotton is the chief article to be marketed there is considerable depression of spirits. This is all so unnecessary that it caused much comment among the Northern business men who took part in the tour. If the cotton producers, as soon as they found out that they were going to have a big crop, had sold the market for delivery, say, in January or March and taken contracts to deliver their goods at the level of prices that obtained earlier in the year the condition of finances in South Carolina and elsewhere in the South would have been vastly different from what it is now.

If cotton costs 8 cents a pound to grow and market, and the present level is not far above that figure, the profits of the cotton planter must be small. If, on the other hand, he had sold short in the market for delivery in January at 14 cents a pound his profits would have been material.

As commercial conditions affect the automobile trade vitally, the cotton market is important to the industry, as regards its southern distribution. The result is quite apparent in the scarcity of new automobiles to be seen on the South Carolina roads.

The highways of South Carolina are mostly built of yellow clay, mixed with varying proportions of sand. As a general rule, they are carefully graded and drained, and in particular spots finely improved. Actual macadam is scarce, but the general average of excellence in the ordinary country roads is higher than that found anywhere along the route to the north.

Of the 134.3 miles covered by the route across the Western end of the state, not more than 20 miles is macadamized and not more than 20 miles can be classed as ordinary road.

The route traverses a section rich in historical lore, passing the battlefield of Cowpens, where the British dragoons and infantry were badly defeated by the patriot forces and driven northward, where they received several other trouncings at the hands of the redoubtable Greene and Morgan. The road was also used

Where King Cotton Holds Full Sway

5—A fine stretch of road leading through the battlefield of Cowpens
6—Average roads near Blacksburg used for heavy cotton traffic
7—New road into Greenville. This one has just been finished
8—The typical South Carolina road, just after leaving Gaffney

to some extent by General Sherman in his famous march to the sea in 1864.

The road enters South Carolina just south of Grover, and the excellent graded road of North Carolina is continued. There are some stiff grades to be covered rounding the foothills of Whitaker Mountain, about 4 miles from the state line, and there is a ford to be crossed before reaching Blacksburg, the first settlement to be passed in the state.

South of Blacksburg the road passes into heavy pine woods, emerging for a moment to cross Broad River and then plunging into the woodland country again on the south side of that stream. There are two considerable grades before reaching Cherokee creek and after that the character of the road changes. Yellow clay takes the place of the red clay that composed the groundwork of practically all the roads to the Virginia line.

The country contains more sand and for ordinary country roads the mixture of sand and yellow clay is ideal. Gaffney, a lively little city, lies 16 miles south of the state line. On leaving this place the road crosses a low range of hills and enters the only really rough spot in the whole way across the state. Even in wet weather this road is not much of an obstacle to the passage of automobiles, as the sand contained in the road-surfacing material gives traction under all conditions. After passing Irene Creek there are heavy grades at intervals clear to Cowpens, a distance of 10 miles.

Most of this distance is through the nearest approach to a wilderness to be found south of Roanoke, but the rolling hills give some evidence of cultivation and as one approaches Cowpens the cotton fields stretch away as far as the eye can reach. The population of this part of the state is sparse and even negroes are not common. But when the vicinity of the old battlefield is reached conditions grow better, and after crossing the Pacolet River, which has been dammed and used to furnish power for extensive cotton mills at Converse, the country improves and at Spartanburg, a fine city of 18,000 inhabitants, there is every evidence of prosperity.

Spartanburg is rated as the third city in point of size in South Carolina and is reckoned to be the second in the United States in the production of cotton-seed oil, besides being in the center of the second largest cotton producing section in the world. Its fertilizer industry is said to produce $1,500,000 a year.

Leaving Spartanburg a fine macadam road leads southward almost to the crossing of the north fork of the Tiger River. From that point to the middle fork of the same stream the way is through vastly productive cotton fields over good clay roads upon which much work has been done. This is about 52 miles from the state line.

Duncan is the next town of any size to be met with and it is also the largest town on the road between Spartanburg and Greenville, 36 miles. But, in spite of this, Duncan is a mere ham-

Widening new road near Blacksburg. Note the road roller and broken stone

let located on the railroad that connects the two larger cities.

At the crossing of the Tiger river improved roads are again found, the main pike leading through Greer to the south. From the river to Greer the road is excellent and after leaving Greer a fine, level highway typical of the roads of the state is encountered. This continues, following the railroad, or rather followed by the railroad, into Greenville. This section of the state is very rich agriculturally. The soil is sandy loam based upon clay, and while it is considered excellent for everything that grows in warm temperate climates it is devoted almost exclusively to the culture of cotton.

The city of Greenville is located at the foot of the Blue Ridge hills. It is the largest cotton manufacturing center in the South, possessing about fifty large mills, the power for which is derived from the Reedy river. It is close to the summit that divides the flat eastern slope from the more rugged territory that lies to the west.

From Greenville to Piedmont on the Saluda river, about 12 miles, the cotton fields grow a trifle monotonous and the hills and woods to be found after crossing the Saluda are welcome to the eye, but do not endure for long. Some of the finest roads in the state are to be found south from Greenville, the surfacing of sand-clay, carefully smoothed and graded, rivaling macadam in its riding qualities.

It is said that five years ago only about one-fifth as much of a load could be drawn over these roads as can be transported over them to-day in wet weather.

The Heart of the Cotton Belt

This section is in the heart of the cotton belt and each mile south finds the cotton whiter and the negroes blacker than they were the last mile back on the road. In Virginia the negroes and the cotton were about of a shade. In North Carolina the cotton was fairly white and the negroes were coffee colored. In the northern tier of counties in South Carolina the cotton was pure white and the negroes black and shiny. But south of Greenville the cotton is glistening snow white and the coons lose even their shine of countenance and are deep Cimerian sable without mitigating circumstance unless one throws a small coin among a group along the roadside. Then there is a swift metamorphosis. Faces crack open and enough ivory is shown to relieve the color scheme materially.

The attitude of the negroes in South Carolina will be found to differ sharply from their usual attitude further north. They are exclusively devoted to agriculture and many among them work land on shares, while a very few own the property they till. Toward the born Southerner the South Carolina negro assumes an attitude of great respect. But if he suspects that the white man comes from the north, particularly from New England, there is sure to be some amusement.

During the Glidden Tour, when the cars were covering this stretch of country, one of the drivers, Thomas Costello, a native of New York, manifestly unfamiliar with the southern conditions, acknowledged the salutes of a party of negroes just outside of Piedmont.

"How are yuh?" inquired Costello genially as his car moved on.

"How ah yu, brothah?" came the response for the crowd, voiced by a huge black woman.

If she had suspected that her white brothah was a citizen of South Carolina she would rather have been stricken dumb than to have made that answer.

The road scene is not changed and lacks much interest to the ordinary tourist clear to Anderson. The roads continue fine all the way in. Anderson is the county seat of Anderson county and is a well-built place, the chief, almost the sole, industry of which is cotton manufacturing. The county raises more cotton than any similar division east of the Mississippi and is exceeded only by some of the Texas counties that are much larger in territorial area than Anderson county.

Some Rough Country Near Georgia Line

Away on the horizon, the cool shadows of the Blue Hills can be seen, but the city itself is situated in the midst of a flat country where cotton is emphatically king. The city of Anderson has no workable waterpower within the city limits, but the county is well supplied with potential forces for manufacturing. So far only a small amount of this power has been developed, it being estimated that there is something like 125,000 horsepower that is not at work. Anderson county raises not less than one bale for each inhabitant and the mills work up 30,000 bales in excess of the annual production of the county.

Lincoln Way Prospects

HARRISBURG, PA., Dec. 11—In accordance with the plans of the Sproul good road bill passed at the last session of the legislature for the building of good roads in Pennsylvania, State Highway Commissioner Bigelow is awaiting the action of the present Congress in regards to the Lincoln way before he begins work of building the road from Gettysburg to Harrisburg.

He declares if the way is authorized he will continue the highway to Harrisburg as a double roadway with grass plot and trees in the center. He is hopeful of the way and desirous of building a road to Harrisburg of the same character. Commissioner Bigelow's attitude is an unanswerable argument in favor of the way that he stands ready for the way, illustrative of public sentiment for the way, that he stands ready for the state of Pennsylvania to continue the most magnificent highway ever planned to the capitol of the Keystone state. Mr. Bigelow declares whether he decides to build one or a double road to Harrisburg that the road will be completed in time for the great anniversary of the battle in 1913.

Harrisburg Club to Fight Bridge Tolls

HARRISBURG, PA., Dec. 11—At the regular meeting of the board of governors of the Motor Club of Harrisburg, held last Tuesday evening at the club's headquarters, Dauphin hotel, it was decided to use every reasonable effort to have tolls on the bridges across the Susquehanna river for all pleasure motor vehicles reduced to uniform charge of five cents for car and driver and one cent for each additional passenger. The present rates are ten cents for touring car and driver and five cents for runabouts and two cents for each additional passenger on all cars. Secretary J. Clyde Myton states that the board is very confident of accomplishing this desirable reform in the toll rate.

South of Anderson to the Keowee river the country continues level and from the Keowee river to the Georgia state line, which is the Tugaloo river, it is slightly rolling. Considerable grades are found, particularly in the latter portion of this stretch. The character of the road is perhaps not quite so high as it was back in the level stretches, but it is well up to the average good road of the South.

The following classification of the roads of South Carolina, as represented by the highway referred to, shows the attitude of the state toward progress. The 20 miles of macadam noted above occur in scattered stretches, particularly entering and leaving Spartanburg, Greenville and Anderson. The longest stretch is the one south of Spartanburg which extends about 7 miles.

The fair to poor roads are those near Gaffney, probably 6 miles of graded new road that makes hard going in wet weather, particularly if deeply rutted. There are also spots of a mile or more to be found at Blacksburg, Taylor, Piedmont and several of them during the final dozen miles north of the Georgia line where considerable work is needed. There are six or seven unbridged fords, none of which is important, but over which bridges and culverts would prove advantageous.

Convict Labor Used to Improve Roads

Convict labor is used exclusively in country road improvement in the state. There is, of course, much contract work to be found in the cities, but out in the country the sight of gangs of striped convicts at work on the roads is of frequent occurrence.

The state is particularly favored in its natural road material, and, as will be noted in the accompanying series of illustrations, it lends itself to the making and maintenance of fine roads.

A few years ago this whole road was just wide enough for the passage of cotton-laden teams. It was not bad even in those days, but its condition was due to nature quite as much as art.

Widening and standardizing the road from Glover to Blacksburg

There was no effort made to reduce grades, where such reduction would cost any considerable sum of money. To-day, this road is practically new from end to end. Where it follows its original lines it has been widened to 16 feet and crowned to shed water. Some effort to make ditches is also to be noted. While the grades in South Carolina never were really heavy, owing to the flatness of the country, there was room for some improvement in this respect. Since the first real movement began to better the road, fourteen cuts have been made that reduce the average grade to a small fraction of over 1 per cent. This has necessitated lowering the grades over a distance of 18 miles. There never was any great necessity for making fills.

The sand-clay packs easily and when it is dragged, after a shower or period of wet weather, it settles soon into a compact surface that becomes a fine, hard road in dry weather if allowed to remain undisturbed until it has had a chance to shed or absorb the water.

There is approximately 15 per cent. of sand in this surfacing material, and as both clay and sand separately and mixed can be found almost anywhere along the road in quantity the state is peculiarly fortunate in that respect.

South Carolina's Greatest Needs

What South Carolina needs more than anything else is some diversity in agriculture and a few real hotels. Undoubtedly there is much wealth developed in the state through cotton culture and manufacture, but there would be more inhabitants of good class if there were more different kinds of produce raised. There is a notable lack of good things to eat offered at the tables of the best hotels in the western part of the state at least. The reason for this lies in the fact that there is no effort of commercial size to raise garden truck and the various kinds of meat. The farmers do raise enough for domestic needs and probably live much better than travelers or tourists.

Practically all the table stuff of South Carolina, one of the garden spots of the whole earth, is imported, save at the particular season of the year when the farmers find they have an overplus of produce. This, of course, limits the table sharply at all other seasons and confines it to hog and hominy in many instances.

The hotel buildings are not as bad as the table, but to house such a party as the Glidden Tour they proved utterly inadequate. One of the witty newspapermen who accompanied the tour wired to his journal something like this after spending the night at one of the cities: "The hotel has no baths and nobody could eat the food, but the proprietor has an excellent singing voice."

Thus some good can be found in the direst situation if only one will try to discover it. This applies even to the South Carolina hotel.

Jeff Davis Highway

LOUISVILLE, KY., Dec. 11—Work on the Jefferson Davis Highway, the proposed 300-mile pike road in western Kentucky, which had its foundation in the convention held at Paducah several weeks ago, has begun in earnest. As soon as the civil engineers complete a survey of Livingston county they will work Caldwell, Crittenden, Lyon and Trigg counties. Owing to its already perfect grading, McCracken county will be the last on the list. Nothing is in the way to hinder the immediate building of the road and it is expected that the highway will be at least half completed within another year. Motorists throughout the western section of the state are deeply interested in the project and it is believed that an extension of the highway will be made later.

Another Toll Road Abandoned

BALTIMORE, MD., Dec. 11—Now that all tollgates within the city limits have been discontinued the commissioners of Baltimore county are following suit in their territory. The first gate in the county to go was that on the Charles Street avenue extension, which runs through one of the most fashionable suburban sections adjacent to the city. The gate was removed and the road made free through a deed transferring it to the Baltimore County Commissioners. The removal was a great surprise to the residents of that section for they had no previous notice that they were going to be so well treated. The toll road was owned by a subsidiary company of the United Railways and Electric Company, the directors of which, in view of the public sentiment favoring the abolition of toll roads, decided to deed the roadbed to the County Cimmissioners without cost to the county, but on condition that the company should have the right to lay tracks on the road and run cars over it should a line become necessary.

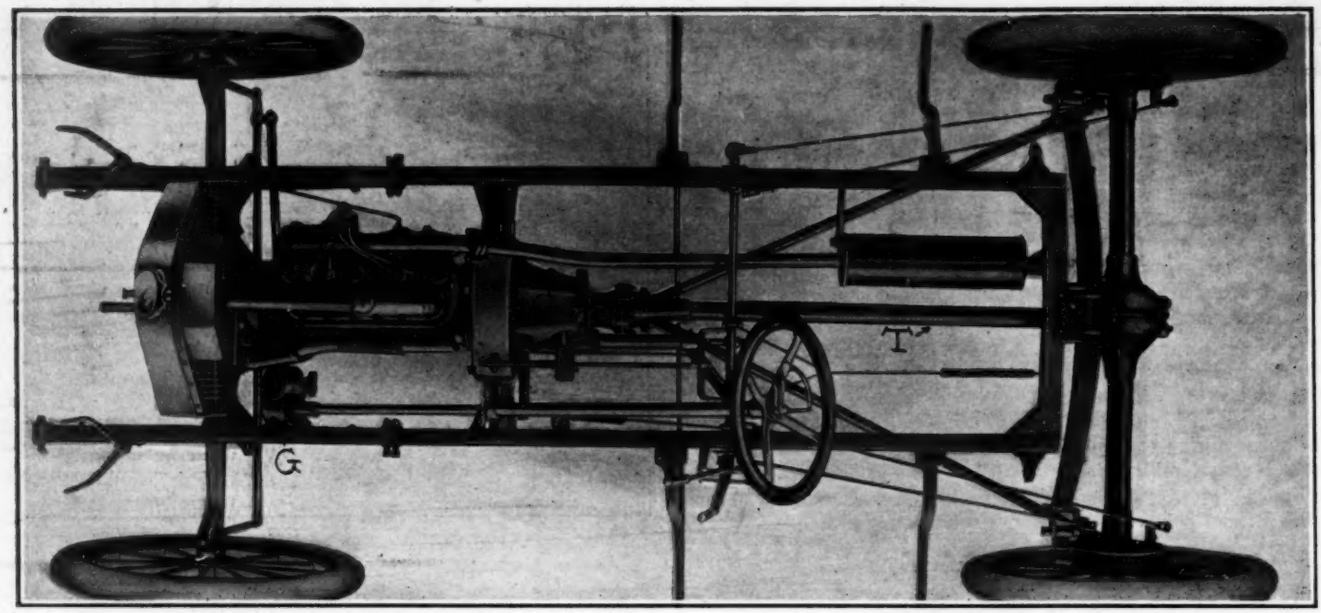


Fig. 1—Plan view of the 1912 Krit model "A" runabout chassis

Few Changes in the 1912 Krit Line

IN bringing forward its line of cars for the season of 1912, the Krit Motor Car Company, of Detroit, Mich., has made no radical departures from the models of previous years. The underslung model, which was introduced into the line last year, has been continued in order to meet the popular demand for this type of car. The underslung car is classified as model U, while the other two models are known as models A and K.

The motors of all three models of cars are of the same construction, being rated at 22.5 horsepower according to the A. L. A. M. formula and having a bore of 3¾ inches and a stroke of 4 inches. This gives a stroke-bore ratio of 1.065. The four cylinders are cast en bloc with the jackets integral, and, as may be seen from the plan view of the chassis shown in Fig. 1, the tops of the cylinders are faced off to allow of the manifold being bolted directly on them. The cylinder casting is connected to the crankcase by means of heavy holding-down bolts as shown in Fig. 2. The broad flange which forms a means of connection between the two castings makes for a tight connection through which the oil thrown from the crankcase will not readily leak.

The material of the pistons is gray iron. They are made by being first cast to a rough fit and then machined and ground to accurate size. They are annealed in the process of manufacture so that they are rendered less brittle and able to stand shock better. Each of the pistons is fitted with four rings, to be seen in Fig. 10, three of them being above the wristpin, while the fourth is located just below it. The wristpin, which is shown at P in the same illustration, is driven into the aperture which is located at the center of the length of the piston and is fastened in place by means of the two set screws shown at S. The upper end of the connecting rod is inserted first and the wristpin passed through it. The set screws are then put into their correct positions and screwed firmly home. The lower end of the connecting rod is fitted with a cap, C, which is placed over the crank-bearing and clamped into place by means of the two cap bolts B. The oil grooves in the connecting-rod cap are shown in the illustration. The pistons and rings are lapped into the cylinder so that a tight and efficient fit is secured. The pistons, connecting rods and wristpins of any cylinder weigh the same as any other set, so that one of the factors toward static engine balance is thus secured. Wristpins are hollow and case-hardened, with an oil hole in the center.

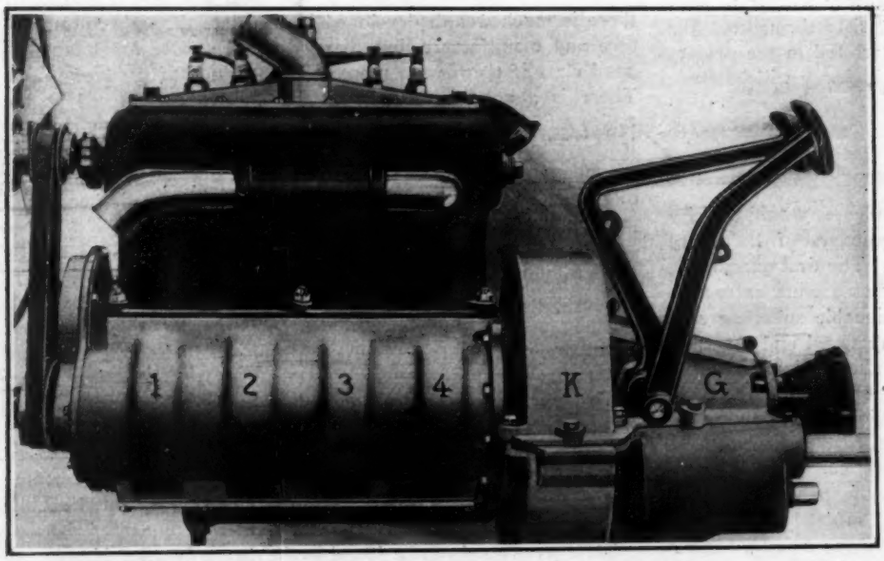


Fig. 2—Left side of motor, showing broad flange for connecting cylinder casting to crankcase

The crankshafts of all the Krit motors are carried upon two exceptionally large annular ball-bearings, the balls of which are ¾-inch in diameter and are

carried in the cages indicated at 1 and 2 in Fig. 10. The shaft itself is a drop forging of special alloy steel. A feature in the construction of the crankshaft is the large connecting-rod bearings which are designed for durability and for the avoidance of the necessity of frequent adjustment.

The valves are completely interchangeable, both the exhaust and inlet valves having the same dimensions throughout and being placed upon the same side of the motor. They are hence driven from the same camshaft and by a single set of cams. The material from which the valves are constructed is nickel steel; they are made thick so that warping difficulties due to the high temperature to which they are subjected have been eliminated to the greatest possible extent. The valve side of the motor is shown in Fig. 3, and from this a fair idea of the amount of valve mechanism exposed may be readily secured. The adjusting device on the tappet-rods is readily accessible as may be seen from the illustration, being located just below the valve springs, which are also exposed. The valve push rods are ground to size and mounted in the cylinder casting, while the valves themselves are ground in the usual manner to their seats.

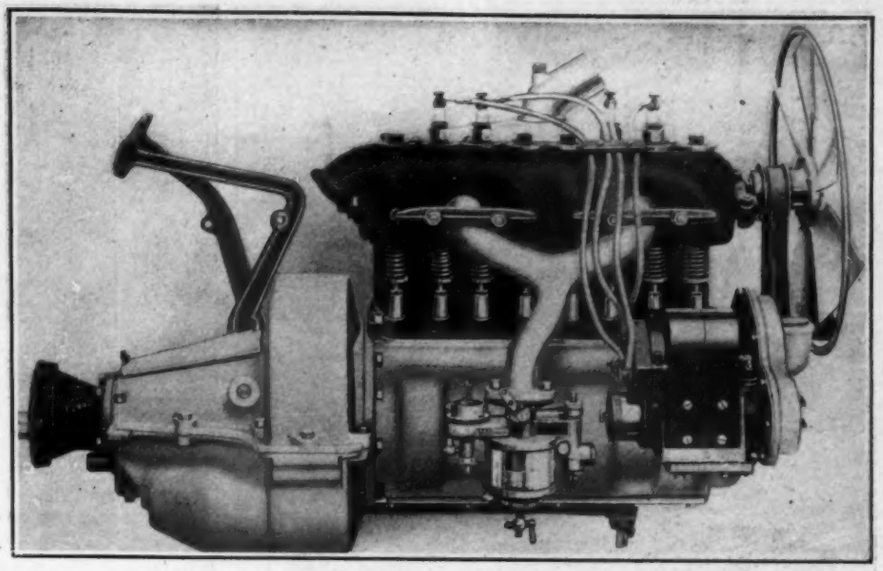


Fig. 3—Valve side of motor, showing small amount of exposed mechanism

The camshaft is an integral forging, the cams being one with the shaft. It is carried upon plain bearings which are lined with bearing metal. The camshaft and cams are hardened together and ground to size. The camshaft is driven through a set of half-time gears which are located in a casing at the front end of the motor. The casing is shown in Fig. 3. It is oil-tight but may be readily disassembled by the removal of the small bolts which hold it together. The gears are three in number and are of the spiral type. The breather pipe is an integral part of the timing gear case. The magneto as well as the camshaft is driven by means of this train of gears.

The motor is cooled by water which is circulated by the thermo-syphon system. A free water circulation is maintained owing to the monobloc jacket casting, which reduces the number of partitions around which the water must pass to a minimum, and hence aids greatly in the rapidity of circulation. The latter feature is of great necessity in a motor using the thermo-syphon system, and hence has been given special attention. The water-piping is of aluminum and is 2 inches in diameter. The connection between the piping and the radiator is of rubber hose, so that all vibrational strains are taken from the metal piping. The radiator is of the vertical tube type, of large size, and is cooled by means of an aluminum fan which runs upon ball-bearings and is driven by means of a leather belt operated directly from the crankshaft. The belt is 1 inch in width and is adjustable for tension.

The carbureter is of Stromberg make and is located on the right side of the motor. This carbureter is of the concentric float type, having the float chamber and mixing chamber in one body. The carbureter is controlled in the usual manner by means of the lever on the steering wheel spider, which, by means of bell crank levers, operates the butterfly throttle-valve in the carbureter.

Ignition is effected by the Bosch high-tension magneto. No battery or coil is used in connection with the ignition system, the magneto sufficing for all purposes.

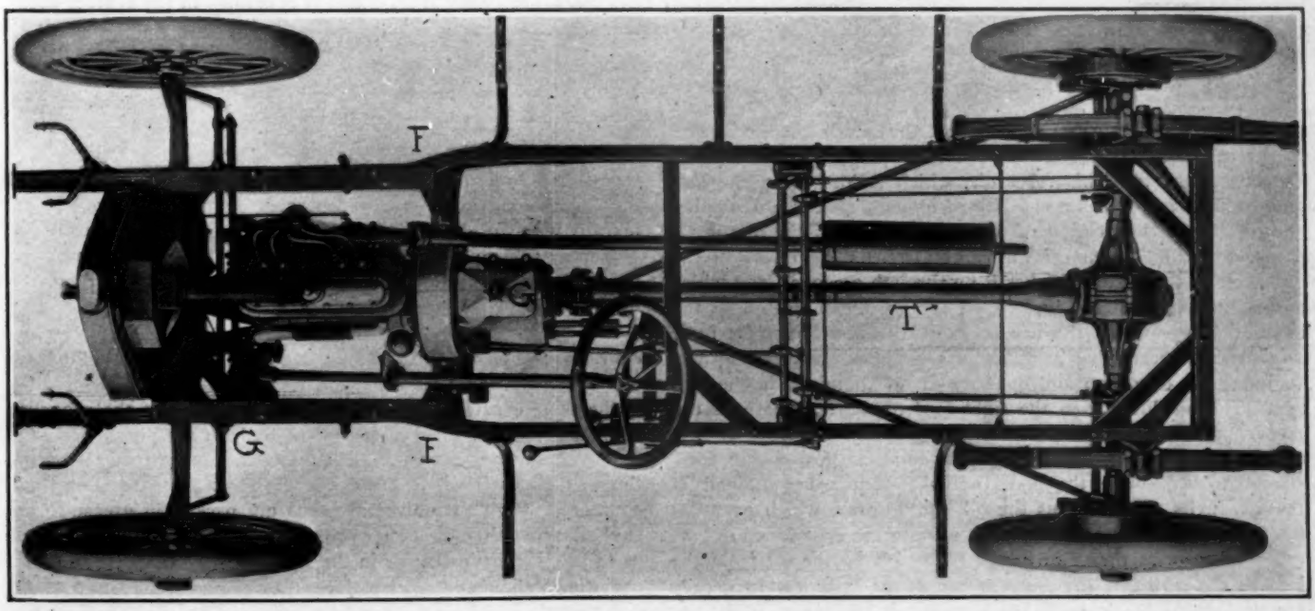


Fig. 4—The Krit touring car chassis, showing its simplicity and compact arrangement

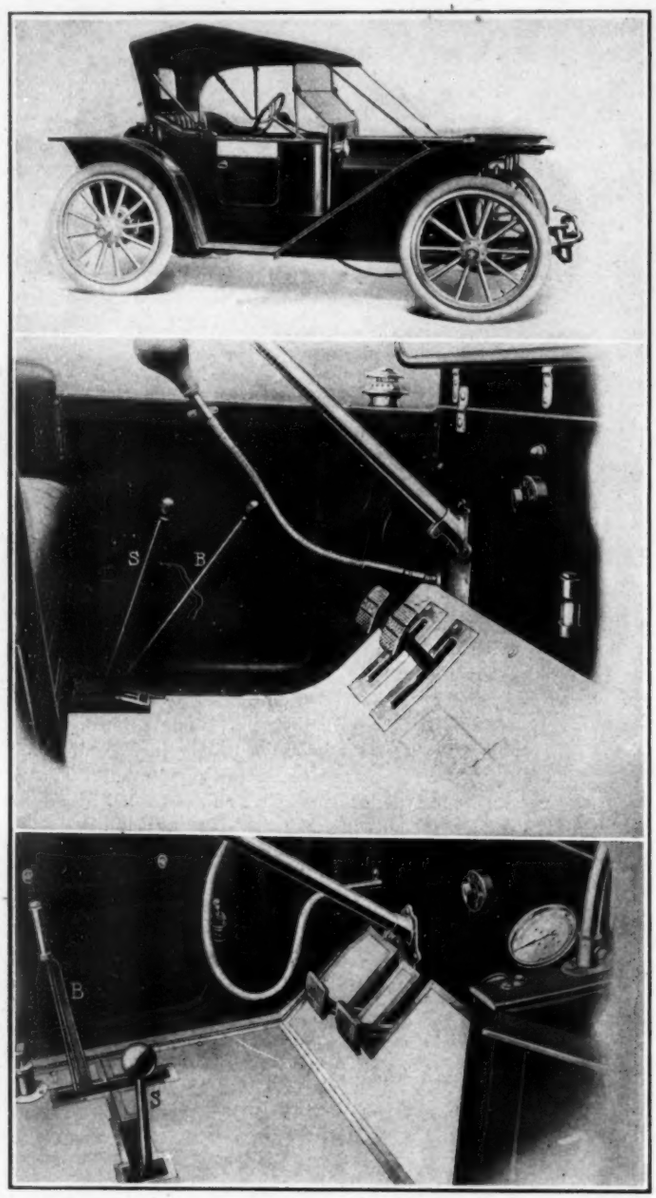


Fig. 5—The Krit underslung roadster ready for the road
Fig. 6—Roadster dash and control levers
Fig. 7—Gearshift lever is in center on touring car

The motor is lubricated by means of the splash system. The oil is carried in the reservoir which forms an integral part of the crankcase casting. This reservoir, which is located in the bottom of the casting, has a capacity of about 5 quarts and supplies the oil for the lubrication of all moving parts of the motor. A pump, which is driven off the camshaft, lifts the oil from the reservoir in the base and takes it up through a copper lead which passes into a sight-feed located on the dash. All the oil in the lubricating system of the car must go through this sight-feed, so that the operator has at all times a ready means of being able to judge the condition and quantity of oil contained in the system. The oil flows from the sight-feed to the crankcase of the motor. The crankcase is divided into a number of troughs, into which the oil is led. The connecting-rods, as they dip in their stroke, pass through the pools of oil which are contained in these troughs. This churns the oil into a spray, which pervades the entire crankcase and is thrown up into the cylinders.

The pistons on their downward path pick up the oil from the side of the wall and lift it up higher in the cylinders until they are thoroughly lubricated. The purpose of the lower of the set

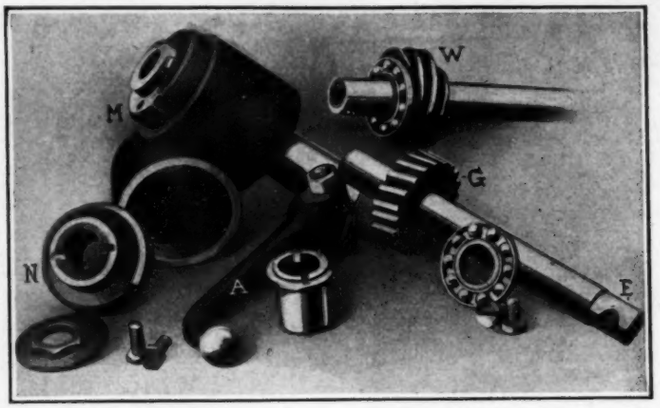


Fig. 8—Parts of Krit steering mechanism. Note ball-bearing thrust

of four piston rings is to eliminate any superfluity of oil and to keep it out of the combustion chamber. The level of the oil in the splash-troughs is kept constant by the supply which passes through the sight-feed. As the oil which is thrown about by the connecting-rods is continually draining back toward the troughs there will be an over-supply of oil in the upper part of the crankcase. This over-supply is taken care of by means of the overflow holes which are placed at the correct level. The oil which passes through these overflow holes passes back into the reservoir in the lower part of the crankcase. Before being recirculated the oil is strained by passing through a wire gauze screen. Oil is supplied to the crankcase reservoir through the breather-pipe. A change has been made in the oiling system of the underslung model in that it is unnecessary to lift the hood, seats or floor in order to replenish the supply of oil in the crankcase. This is also true of the gasoline and water supplies. An oil-pump on the floor of the car takes the oil from the reserve tank and places it in the crankcase. This operation may be made while the car is running.

The housing for the flywheel, clutch and gearset is illustrated in Fig. 9. This is an aluminum casting and is bolted to the aluminum crankcase in the manner shown in Fig. 3. A view of the clutch, which is of the multiple disc type, may be seen in Fig. 9. The discs are shown at C. The gearset shaft is a continuation of the clutch shaft, which is unbroken by a universal joint at this point and is supported by the ball bearings shown at B. The change-speed shaft is located in the lower part of the gearset housing, and is also carried upon annular ball bearings. The entire mechanism runs in oil which is contained in the gearset housing. That the supply of oil may be readily drawn off the gearset and fresh oil provided, there are drain-cocks fitted in the lower part of the housing. The manner of attaching the housing to the frame is shown in Fig. 4 at E. The change speed gear is of the selective sliding type, giving two speeds forward and one reverse. The reverse pinion rests idle while the car is moving forward. The material from which the gears are cut is of special steel. The change-speed gear operates along four keys cut integrally with the shaft. The material of the housing is aluminum. The hand-hole cover G is readily removable by simply turning the hand screw shown in Fig. 10, thus permitting of easy inspection of the change-speed mechanism.

The drive is taken up by the propeller shaft through an inclosed universal joint. The housing, which is connected to the torque tube T, takes all the strain from the universal joint. This is the same construction that is used at the rear of the propeller shaft, where a universal joint is also fitted for the purpose of providing protection against the changes of alignment which occur, due to different loads in the car, and also to the road shocks encountered. Both the universal joints are packed in grease to insure silence and an ample supply of lubricant at all times, as well as to provide against noise in the gears.

Through the rear universal joint the drive is transmitted to the differential, which is of the bevel type. The short differential

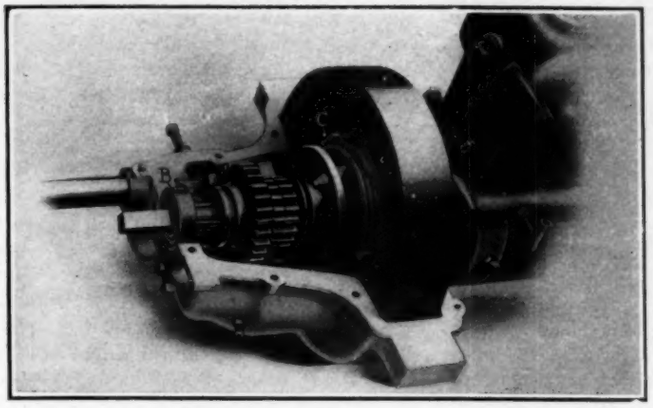


Fig. 9—Showing the simplicity of the clutch and transmission

shaft is carried on annular ball bearings and terminates in the usual star pinion which engages the bevel gear operating the differential wheels. From these wheels the power is transmitted to the semi-floating rear axle, which is carried upon ball and roller bearings.

The service brakes are of the internal expanding type on the models A and U, but on the model K they are contracting. The brakes are located on the rear wheel hubs and operate upon drums which are 9 inches in diameter. The emergency brakes on all the models are of the expanding type and are faced with non-burning material. The service brakes are fitted with equalizers through which the pressure on the drums on either side of the car is made equal; they are controlled by means of a pedal which is operated from the driver's seat. The emergency brakes are operated according to the usual custom, by a lever located to the left of the driver's seat.

The frame is of channel section 4 inches deep for the greater part of the length. It is of straight construction in models A and U, while the model K cars are equipped with frames whose side members are of the same dimensions as in the other two models, but having a single drop. The front axle is a one-piece drop forging of vanadium steel having an I-beam section. The spindles are drop-forged and are also of vanadium steel.

The chassis is supported by semi-elliptic springs in front and in the rear on the models A and U by a single transverse emi-elliptic spring. The model K chassis is supported in the rear by two scroll elliptic springs. The material of which the springs are composed is vanadium steel.

The steering mechanism is of the worm and gear type. It is shown disassembled in Fig. 8. The thrust on the gear is taken by a ball thrust joint designed to eliminate jar on the arm of the operator. The worm is shown at W with the ball bearing in position. The gear G is fitted on the shaft E which carries the arm A, the whole fitting into a sleeve housing M and inclosed by the cover N. The housing is dust-proof and is packed in grease to promote silence and durability in this part of the mechanism. The steering wheel is of Circassian walnut and is 16 inches in diameter. The steering column is rakishly tilted at an angle of 33 degrees. The housing is shown bolted to the chassis frame at G, Figs. 1 and 4.

The wheels are 32 inches in diameter and are made from selected second-growth hickory stock. They have twelve spokes and rotate on ball and roller bearings. The tires used in connection with the wheels are 32 x 3 inches both front and rear. On the model U underslung the wheels are made extra large, being 36 inches in diameter and using 36 x 3 1-2-inch tires. The wheelbase of the model A is 96 inches, that of the model U 98 inches and of model K 106 inches. The road clearance is 10 1-4 inches on the underslung model and 11 inches on the other models.

The control mechanism is illustrated in Figs. 6 and 7, where S is the gear-shifting lever and B is the emergency brake lever. It will be noticed that the brake lever is on the left side of the driver's seat on all models. The gear-shift quadrant is different on the model K cars, where three forward speeds are given instead of two.

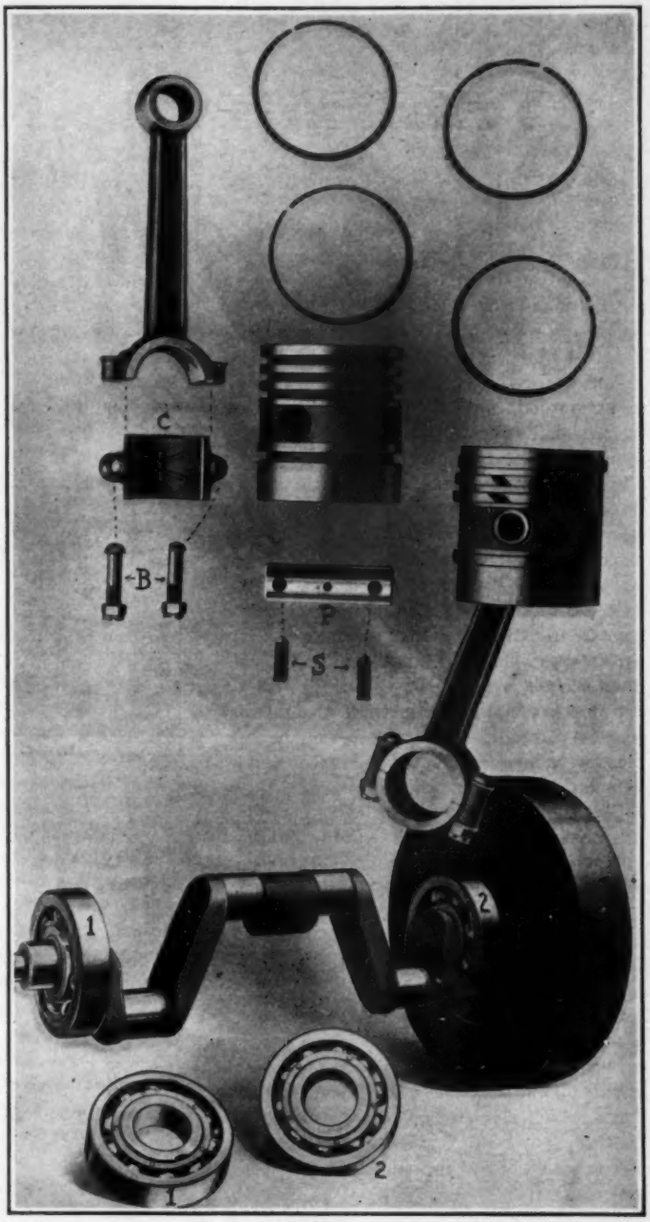


Fig. 10—Some of the Krit motor parts. Four rings are used, one below the wrist pin. The main bearings of the crankshaft are carried on two exceptionally large annular ball bearings

The equipment furnished with the cars includes three oil lamps, two gas lamps, generator, horn, tool kit, full set of tools, jack, pump, tire repair kit, top including side and corner curtains, windshield and demountable rims.

ODORLESS BLUE SMOKE—Experiments are reported in *Chemiker Zeitung* by Dr. F. Schwartz and Dr. H. Schlueter relating to a treatment with acetone of cylinder oil for automobile motors having for their object to remove the components which are least combustible and therefore most liable to cause a disagreeable odor in the exhaust gases. Trying the oil so refined competitively against the oil usually employed, and from which it had been produced, it was found that the new material produced clouds of smoke in case of excessive oiling, but the clouds were odorless. —From *Automobil-Betrieb*. November 1.

Transmission Ratio and Torque

By Forrest R. Jones

IT is doubtless well understood in a general way that change-speed gears are used in the transmission system of an automobile in order to obtain, when the gears are set at one of the slower speeds, tractive effort at the road wheels sufficient to drive the car up a steep grade or along a heavy road, to obtain slow speed of travel in crowded streets or on a rough road, and to make the starting of the car certain without running the risk of stopping the motor. The latter applies especially when the clutch is one of those that have the very prevalent fault of taking hold suddenly so that the road wheels must either spin or the motor stop, in either case causing the car to start with a lurch, especially on an upgrade. The tractive effort of the road wheels is due to the rotary effort of the motor which is transmitted to the road wheels through the transmission system. Rotary effort is also known as torque, twisting effort and turning moment.

The rotary effort or torque delivered to the driving road wheels is greater than the rotary effort of the motor, in the usual forms of construction, probably in all forms. This does not mean that the power delivered to the road wheels is greater than that delivered by the crankshaft of the motor. The power received by the road wheels is always less than that delivered by the crankshaft of the motor, because some of the power is lost during transmission on account of the friction at the bearing surfaces which slide or roll over each other. If there were no frictional loss then the power received by the road wheels would be exactly the same in amount as that delivered by the crankshaft of the motor. A clear understanding of this and of the meaning of torque and analogous terms can be obtained by dealing first with some very simple cases leading up to the conditions which exist in automobile transmissions.

Fig. 1 represents a beam provided with three knife edges, A, B and C, such as is used for weighing scales of the beam type. The intermediate knife edge B rests on a support. Each of the other knife edges has a clevice hanging on it, so that weights may be suspended from them. The beam is made heavy at the short end so that it balances on the support when no weights are suspended from the clevices. If a weight is hung on the device at either end of the beam it has a tendency to draw the corresponding end of the beam downward and thus swing the beam around the intermediate knife edge B. The amount of this tendency is expressed by the product obtained by multiplying the weight by the horizontal distance between the intermediate knife edge B and the knife edge on which the weight is hung. This distance is called the lever arm of the weight. If a 200-pound weight is hung from the clevice on A, and its lever arm is 6 inches, as shown, then the amount of the tendency to swing the beam downward is: 200 pounds × 6 inches = 1,200 inch-pounds.

The beam can be prevented from swinging by hanging a suitable weight on the

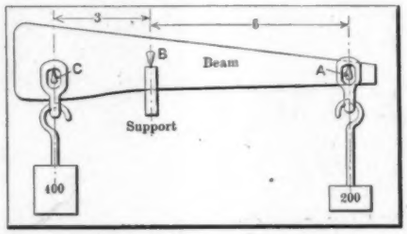


Fig. 1—Conditions of equipoise on lever

clevice at the short end of the beam. The amount of this weight must be such that when multiplied by its lever arm the product will be 1,200 inch-pounds, as before. The lever arm at the short end of the beam is 3 inches. The required weight is therefore 1,200 ÷ 3 = 400 pounds.

Fig. 2 is the end view of two drums and a shaft, all rigidly fastened together and supported by bearings in which the shaft is free to rotate. Each of the drums has a weight suspended by a rope which is wrapped around the drum and fastened at the end to the drum. For convenience it will be assumed that the drums are grooved to a depth such that the tops of the grooves are even with the center lines of the ropes.

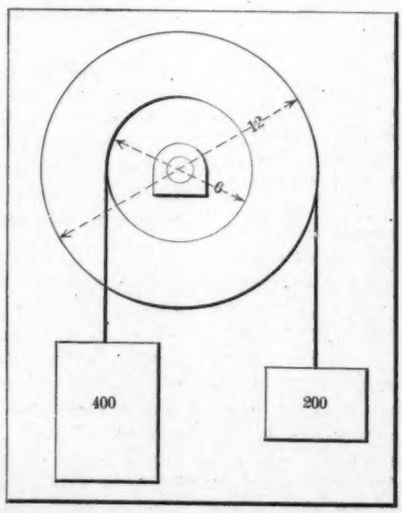


Fig. 2—Balanced weights on shaft and two drums

By this assumption, the radius of the drum is equal to the distance from the center line of the rope to the center line of the shaft. The radius of the drum is therefore equal to the lever arm of the weight that is suspended from the rope that is wound on the drum. The same apparatus is shown in a different manner in Fig. 3. These illustrations are both shown in order to make the construction of the device entirely clear. The weights and their corresponding lever arms are the same in value as in Fig. 1. Each weight has a tendency to rotate the drums and shaft in the direction that will unwind the corresponding rope from its drum. This rotative effort is 1,200 inch-pounds for each weight, obtained as before by multiplying together the weight and its lever arm. The shaft connecting the two drums is subjected to a torque of the same amount, 1,200 inch-pounds, since the rotative effort is transmitted through it from one drum to the other. Only the portion of the shaft between the drums is subjected to this torque, however.

If the drums and shaft are rotated, then the 200-pound weight will move twice as fast as the 400-pound one, since the drum on which its rope is wrapped has twice the diameter of the other drum. If the 200-pound weight descends 50 feet the 400 pounds are lifted 25 feet in consequence. The amount of mechanical energy expended by the lighter weight while descending through the 50 feet is expressed by the product obtained by multiplying the weight by the distance through which it moves, as follows: 200 pounds × 50 feet = 10,000 foot-pounds.

The amount of work done upon the 400-pound weight to lift it 25 feet, found in the same manner, is: 400 pounds × 25 feet = 10,000 foot-pounds.

During one revolution of the drums the 200-pound weight moves through a distance equal to the circumference of the drum on which its rope is wrapped. The drum for this weight has a diameter of 12 inches = 1 foot; the corresponding circumference is 3.1416 feet. The mechanical energy expended by the descending 200-pound weight during one revolution of the drum is therefore 200 × 3.1416 = 628.32 foot-pounds.

The amount of work done upon the 400-pound weight to lift it through the distance corresponding to one revolution of its drum, whose circumference is 1.5708 feet, is 400 × 1.5708 = 628.32 foot-pounds, which is of the same amount as the energy expended by the descending lighter weight during the same movement of the mechanism.

If there were no frictional resistance to the movement of the mechanism, then the mechanical energy expended by one of the weights while descending would be just sufficient to lift the other. On account of the frictional resistance to movement which is always present, the mechanical work accomplished is always less than the mechanical energy expended to accomplish it. For convenience, however, it is customary to assume that there are no frictional losses. This assumption is made in order to obtain a method by which the forces exerted to rotate the parts or to resist rotation can be readily computed. An allowance is then made for the frictional losses in accordance with experience or judgment. This method of neglecting frictional losses will be used still further in relation to the different forms of transmissions that will be discussed.

Two gear wheels on parallel shafts with the teeth of the gears intermeshing with each other are shown in Fig. 4. Each of the shafts also carries a drum that is rigidly connected to the corresponding gear wheel. Both of the drums are 8 inches in diameter. One of the gear wheels has forty-eight teeth and the other ninety-six teeth. The forty-eight-tooth gear must make two revolutions to rotate the ninety-six-tooth one through one revolution. This is because the larger gear has twice as many teeth as the smaller one. Since the teeth of the two gears engage each other, a rotative movement of one of the gears corresponding to one tooth plus one tooth space must be accompanied by a movement of one tooth and one tooth space of the other gear. The gears rotate in opposite directions.

Each drum has a weight suspended from it in the same manner as has been used before. When the gears are rotating the 300-pound weight on the drum of the forty-eight-tooth gear moves twice as fast as the 600-pound weight on the drum of the ninety-six-tooth gear, both drums being of the same diameter as has been stated. The distance passed through by the 300-pound weight during any movement of the mechanism is twice as great as that passed through by the 600-pound weight. If the 300-pound weight descends 20 feet the

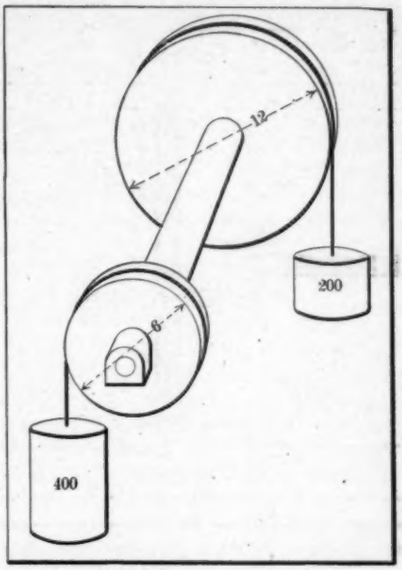


Fig. 3—Perspective view of weighted drum set

the energy given up by it is $300 \times 20 = 6{,}000$ foot-pounds. During this movement the 600-pound weight is lifted 10 feet, which requires work done upon it to the amount of $600 \times 10 = 6{,}000$ foot-pounds. The energy expended and the work done are equal in amount in accordance with the assumption that there is no frictional loss.

The torque in the shaft of the smaller gear is equal to its suspended weight multiplied by the radius of the corresponding drum. Its numerical value is 300 pounds × 4 inches = 1,200 inch-pounds.

The torque acting on the shaft with the larger gear is determined in the same manner and is 600 pounds × 4 inches = 2,400 inch-pounds.

The rotative speeds of the two shafts are inversely proportional to the numbers of teeth in the gears attached to them.

The torques acting on the shafts are directly proportional to the numbers of teeth in the corresponding gear wheels.

The torques are inversely proportional to the rotative speeds.

When the rotative speed of one of the shafts is known that of the other can be found as follows:

Rule 1—When two gears intermesh with each other the rotative speed of the second can be found by dividing the number of teeth in the first by the number of teeth in the second, then multiplying the quotient thus obtained by the speed of the first. Either gear of the pair can be considered as the first.

The rule is otherwise expressed by the following formula, in which one of the gears is called A and the other is called B.

$$\text{Rotative speed of gear B} = \frac{\text{Number of teeth in A}}{\text{Number of teeth in B}} \times \text{speed of A} \quad (1)$$

When the torque acting on the shaft upon which one of the gears is mounted is known, the torque acting on the other shaft can be determined by the following rule, in which it is assumed that there is no frictional loss.

Rule 2—When two shafts are connected together by two intermeshing gears, the torque acting on the second shaft is found by dividing the number of teeth in the second gear by the number of teeth in the first gear, then multiplying the quotient by the torque acting on the first shaft.

The formula corresponding to rule 2, designating one of the shafts and its attached gear as A, and the other shaft and its attached gear as B, is

$$\text{Torque for shaft B} = \frac{\text{Number of teeth in gear B}}{\text{Number of teeth in gear A}} \text{ Torque acting on shaft A} \quad (2)$$

Fig. 5 is similar in its nature to the last preceding figure. One of the intermeshing gears has forty-eight teeth and the other 120 teeth. The smaller gear and its shaft are designated as A and the larger gear and its shaft as B.

If the gear A is rotated at the rate of 100 revolutions per minute, then in accordance with both rule 1 and formula 1,

$$\text{Rotative speed of gear B} = \frac{48}{120} \times 100 =$$

40 revolutions per minute.

The torque in shaft A, due to the 300 pounds suspension from the 8-inch diam-

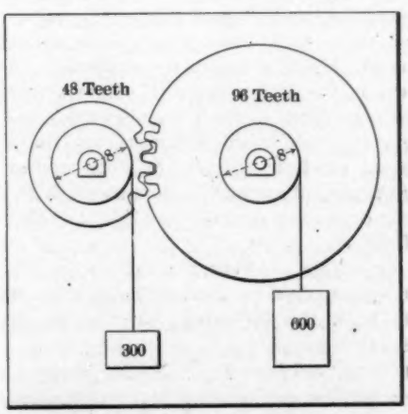


Fig. 4—Torque balanced on half-time gearset

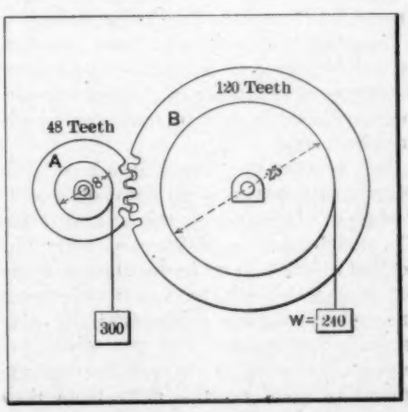


Fig. 5—Balanced torques on 2:5 reduction gear

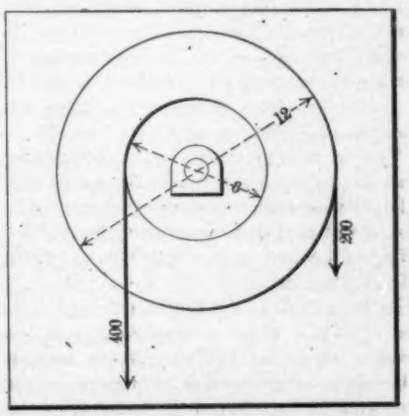


Fig. 6—Vectors indicating loads in diagrams

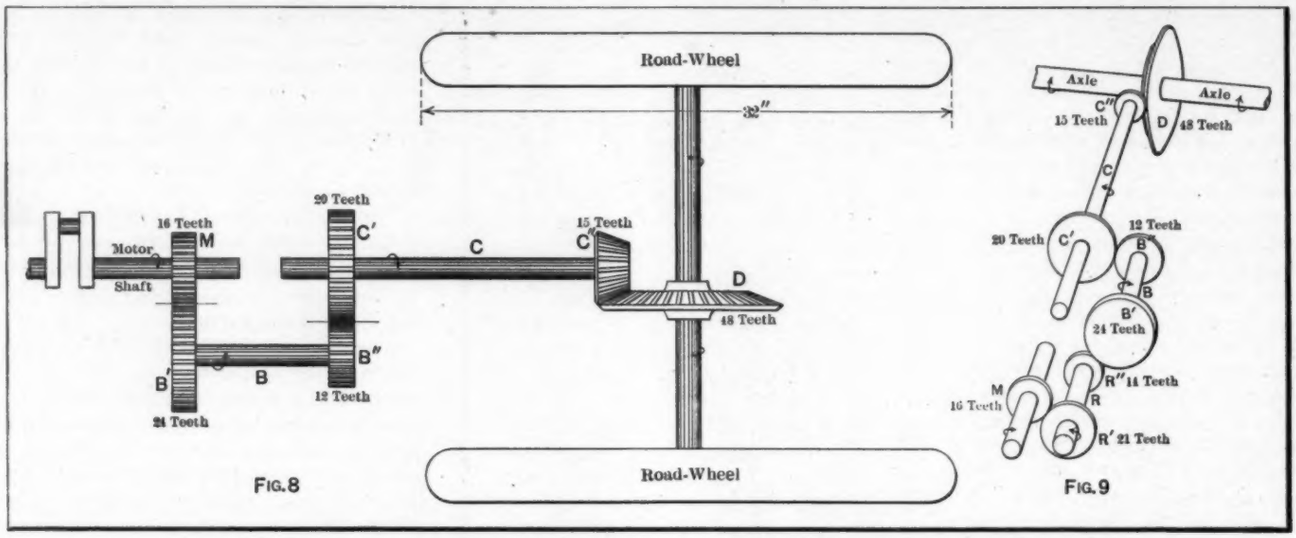


FIG. 8 FIG. 9

Fig. 8—Power transmission through change-speed gears. Fig. 9—Transmission gearset including reverse gear

eter drum, is $300 \times 4 = 1{,}200$ inch-pounds. The corresponding torque in shaft B, in accordance with rule 2 and formula 2, is:

$$\text{Torque for shaft B} = \frac{120}{48} \times 1{,}200 = 3{,}000$$

inch-pounds.

If this amount of torque is due to a weight W suspended from a drum 25 inches in diameter, as shown, then the amount of this weight can be found by dividing the 3,000 inch-pounds of torque by the lever arm of W, whose length is $25/2 = 12.5$ inches. Accordingly, $W = 3{,}000/12.5 = 240$ pounds.

Instead of showing the weights themselves, as in the preceding figures, each weight may be represented by a line. Thus, in Fig. 6, which is the same as Fig. 2, except for the substitution of heavy lines with arrow heads for the weights of the former figure, the heavy arrow-headed lines represent the rotative forces due to the weights. The arrow head indicates the direction in which the force acts on the body in connection with which it is considered. If the line is of such a length as to represent the amount of force according to some scale, as a scale of a certain number of pounds per inch of length, then it is called a vector. A convenient method, however, is to write alongside the line the amount of force which acts in the position indicated. This may be done either when the line is a vector or when it merely indicates the position and direction of the force.

The force represented by a line may be that due to any other source than a weight. The line may represent the pressure of a piston rod against its crankpin, the tractive effort of a wheel upon a roadway, the force of a spring, etc.

In Fig. 7, A is the crankshaft and C is the crankpin, which moves around in the smaller circle as the crankshaft rotates. The heavy arrow-headed line represents the amount and direction of the pressure of the connecting rod against the crankpin while the crank is in the position shown. This pressure or force tends to rotate the crankshaft. The rotative effort is found, as before, by multiplying the force by the length of its lever arm. The length of the lever arm is the shortest distance between the line of action of the force and the center of rotation of the part acted on by the force. In this case it is the distance, perpendicular to the line of action of the force, between the center of the crankshaft and the line of action of the force. The force is given in the figure as 600 pounds. Its lever arm is 3 inches for the position of the crank shown. The rotary effort is therefore $600 \times 3 = 1{,}800$ inch-pounds. The lever arm changes its length as the crankshaft rotates.

An eighteen-tooth gear is fastened to the crankshaft and meshes with a twenty-four-tooth gear on another shaft B, to which is attached a 32-inch drum or wheel whose rotation is resisted by a force T applied tangent to the 32-inch circle. The torque transmitted to the shaft B, due to the 1,800 inch-pounds of torque acting on shaft A, is

$$\text{Torque in shaft A} = \frac{24}{18} \times 1{,}800 = 2{,}400$$

inch-pounds.

The lever arm of the unknown force T is the radius of the 32-inch diameter wheel. Therefore, $T = 2{,}400/16 = 150$ pounds.

The force T may be considered as either the pull of a rope wound on the wheel or as the frictional resistance to slipping between the wheel and the floor or road upon which the wheel rests.

Fig. 8 represents the principle of the transmission system in an automobile with change-speed gears of the sliding type. The clutch and the differential gears are omitted in order to make the illustration as simple as possible so that no confusion may arise when referring to the different parts shown. The number of teeth given for one of the gears is 12 and 24 for another. In good practice more teeth than either of these numbers are used in a gear, but these small numbers have been selected in order to have a different number of teeth in each gear of the system so that each gear can be distinguished by the number of its teeth, and at the same time to keep the numerical part simple so that computations can be readily followed.

The gear wheel M receives power from the motor and transmits it to its intermeshing mate B'. From B' the power is transmitted through the shaft B to the gear B", which in turn transmits it to its intermeshing mate C'. From C' the power is transmitted through the shaft C to the bevel pinion gear C", which meshes with gear D. The power is transmitted from C" to D and thence through the live axles to the road wheels. The latter rotate at the same speed as the gear D. The curved arrow on each shaft indicates the direction of rotation of the shaft and of the gears attached to it.

Considering each pair of intermeshing gears, one drives the other. Thus the gear M drives its intermeshing mate B'. All of the driving gears of the entire system as shown are M, B", C", and all of the driven gears are B', C', D.

The ratio of the speed of the motor crankshaft to that of the road wheels can be found in the following manner:

Rule 3—First determine which gear drives the other in each pair of intermeshing gears while the motor is supplying power. Multiply together the numbers of teeth in the driven gears to obtain a first product. Then multiply together the numbers of teeth in the driving gears for a second product. Divide the first product by the second product. The quotient is the ratio of the speed of the crankshaft to that of the road wheels.

By letting the letter which designates each gear stand for the number of teeth in the gear, the following formula can be used:

$$\frac{\text{Speed of road wheels}}{\text{Speed of crankshaft}} = \frac{B' \times C' \times D}{M \times B'' \times C''} \qquad (3)$$

As shown in the figure, M = 16, B′ = 24, B″ = 12, C′ = 20, C″ = 15, D = 48. By substituting these numbers in the last formula and solving it,

$$\frac{\text{Speed of crankshaft}}{\text{Speed of road-wheels}} = \frac{24 \times 20 \times 48}{16 \times 12 \times 15} = 8$$

This means that the crankshaft of the motor makes eight revolutions while the road-wheels make one.

Since the torques in different parts of a transmission system are inversely proportional to the rotative speeds of the parts when each of the parts is transmitting the same amount of power, the torque delivered to the axles of the road-wheels is eight times that in the crankshaft. It may be noted, however, that the torque delivered to the axles is divided into two equal parts for transmission through the axles, half of the torque going to drive one of the roadwheels and the other half going to the other road-wheel to drive it.

For each 100 inch-pounds of torque at the motor crankshaft there will be 8 × 100 = 800 inch-pounds of torque delivered to the axles, allowing nothing for friction loss. This is also the total amount of torque delivered to the road-wheels, or 400 inch-pounds to each road-wheel. The radius of the road-wheels is 16 inches. Therefore the tractive effort exerted by each road-wheel is

$$\frac{400}{16} = 25 \text{ pounds.}$$

When the side-shaft B and its gears are thrown out of operation, and the motor shaft connected to the shaft C for direct drive, then the bevel gears are the only ones in operation. The speed ratio of the crankshaft to the road-wheels is then 48/15 = 3.2, and the torque delivered to the axles is 3.2 times that at the motor shaft under the same condition of driving. The tractive effort of each road-wheel for each 100 inch-pounds of torque at the crankshaft is then

$$\frac{100 \times 3.2}{2 \times 16} = 10 \text{ pounds.}$$

In Fig. 9 a pair of reversing gears, R′ and R″, rigidly connected together by the shaft R, are shown in the transmission system. As before, the direction of rotation of each shaft and its gears is indicated by the curved arrow around the shaft. The number of teeth in R′ = 21 and in R″ = 14. The velocity ratio of the crankshaft to that of the road-wheels is

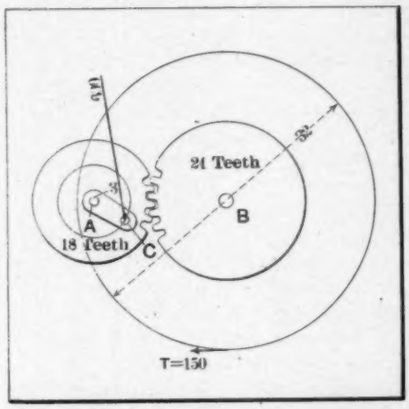


Fig. 7—Multiplying torque delivered at crankshaft

$$\frac{\text{Speed of crankshaft}}{\text{Speed of road-wheels}} = \frac{R' \times B' \times C' \times D}{M \times R'' \times B'' \times C''} = \frac{21 \times 24 \times 20 \times 48}{16 \times 14 \times 12 \times 15} = 12$$

This special ratio is 50 per cent. higher than that obtained for forward travel on slow speed, as has been computed. The torque in the axles and the tractive efforts of both of the road-wheels together are also greater in the same proportion. In the earlier automobiles advantage of this greater tractive effort was sometimes taken to run a car backward up a hill that it would not climb running forward on account of the motor not being powerful enough.

On account of frictional loss of power the tractional effort is of course smaller in each case than the amount obtained by the method that has been used. The actual tractive effort is obtained by deducting the friction loss from the values that have been determined. The amount of power lost in friction varies exceedingly in different transmission systems, and in any one system under different conditions of lubrication and adjustment of the bearings. In a well-constructed transmission system the power lost in friction between the motor and the road-wheels may be as little as 10 per cent. of the power of the motor. The friction loss will run as high as 40 per cent. or more in a poorly constructed or badly worn system while operating on one of the slower speeds.

Harking Back a Decade

FROM *The Motor Review*, December 12, 1901:

The Henry Ford Co., capital $60,000, has just been incorporated at Detroit. The company will manufacture an automobile designed by Henry Ford, a mechanical engineer. Mr. Ford will superintend the works.

The fourth annual exhibition of the automobile, the cycle and sports opened at the Grand Palace, Paris, December 10. Alcohol apparatus formed one of the most interesting exhibits. The show of motor implements for agriculture was impressive.

Under a ruling of the United States Circuit Court at Cleveland, the injunction granted against the Goodyear Tire & Rubber Co. on behalf of the Consolidated Rubber Tire Co. has been vacated. The suit was based upon alleged infringement of patents controlled by the Consolidated covering the use of wire passing through the core of the tire binding it to the wheel. The Goodyear company will now be allowed to make and sell tires again.

Four new rules have been added to the racing code by the Automobile Club of America. First, no automobile shall receive further attention and care by others than the driver and mechanic after having been placed in the starter's care. Second, in all races for record automobiles shall be classified by weight. Third, bicycles, tricycles and tandems shall not compete with four-wheelers. Fourth, during the running, only the driver shall have control of the steering power.

Mr. and Mrs. Robert Shaw, of Chicago, have sailed for Paris for a tour of southern France and Spain in an automobile. The Shaws intend to make a more extended tour next Spring.

Exports of automobiles and parts from New York last week totalled $3,800 in value.

The Century Motor Vehicle Company, of Syracuse, is about to install a new selling plan for its product. This consists in sending factory mechanics into a certain sales territory to demonstrate the performance of the cars. The company is not considering the establishment of more agencies this season because it wishes to test out its plan of demonstrating by the mechanics.

The recent race meeting held at Narragansett Park proved to be a big success in a financial way.

The Chicago Automobile Club has commenced its winter program of entertainments and lectures. The first meeting which was held last week was attended by more members than ever were present at a club function. The club has decided to cooperate with the local golf clubs so that its members may have the privileges of the country houses of the golf clubs in return for similar town privileges for the golfites.

A patent has just been issued to Walter Twitchell on an automatic starting device. This consists of a spring which winds up with a key before starting and when released revolves the crankshaft.

Digest of the Leading Foreign Papers

Guiding Thoughts as Voiced by Renault

THE opinions, with regard to the proper principles for automobile construction, entertained by Louis Renault, of France, the well-known manufacturer whose recent visit to American factories is well remembered, have lately been the object of considerable public attention which can be only in part accounted for by the commercial and technical success of the Renault manufacture. The fact that Renault's 1912 cars still bear the imprint of certain fundamental ideas which he conceived before the opening of this century and embodied in his product in opposition to the views then currently accepted, has fostered a high opinion of his intuitive insight, and the fact that he never graduated as an engineer but burst into actual manufacture on a small scale at the age of 19, together with his brother Marcel who was killed in the Paris-Madrid race of 1902, has added a certain glamour to his reputation as a designer endowed with a peculiar understanding of the essentials among a maze of mechanical possibilities.

In connection with his visit to the automobile show in Berlin last month Mr. Renault was interviewed by Dr. Ernst Valentin and the latter has rendered an account of the opinions which were expressed on that occasion; an account in which Dr. Valentin refrains from all criticism while prefacing it with a declaration of somewhat general dissent.

The account deals successively with the first basic principle for choosing among proposed innovations, valveless motors, repair facilities, clutches, spring suspension, metal and wood wheels, maximum and average efficiency of motors, motor lubrication and unit construction. Mr. Renault said, in substance:

"It is a great error to heed the fashions, as doing so cannot be reconciled with the necessity for having every innovation tried out for months or years by competent technical persons.

"My principle has always been the greatest simplicity consistent with greatest durability, and I therefore long ago rejected chain-drive, make-and-break ignition, water pumps and automatic regulation of the motor.

"It should be the automobile designer's aim to get along with the smallest possible number of parts in the automobile and in each part of the automobile.

"I have tried all innovations fully before rejecting them.

"As my views on valveless motors are especially desired, I will say that I have made very extensive experiments with sleeve-valve motors and have reached the conviction that it would be wrong to throw over our excellently proved-out poppet valve system as yet. It is true that the sleeve-valve motor by its noiselessness has contributed to advance the art of construction materially, compelling imitation of this feature, but it is false when the silence of the valveless motor is ascribed solely to the abandonment of the poppet valve. The latest types of poppet valve motors which are also justly designated as noiseless prove the correctness of this view.

"By the abandonment or improvement of the gearing used for driving the camshaft one of the main sources of noise has been removed. Noise can also be obviated by using an elastic coupling between the armature shaft of the magneto and the motor shaft, as for example by the insertion of rubber discs in the coupling. First and last, however—and this is what the valveless motors have taught us—the whole valve mechanism should be encased in the interior of the motor. When the spaces in which the valve-rods work are filled with grease, it is impossible to hear any noise from the valves. And now, since the designers very generally have adopted these improvements, I am of the opinion that the noiseless poppet valve motor is more practical than the sleeve-valve motor.

"I don't believe in building many things into one unit but in placing each organ which may have to be repaired or inspected distinctly and separately; so that, for instance, a chauffeur may be enabled to take the cylinders of his motor down, clean them and put them together again without going to a factory or to a repair shop. I don't think it is possible to do this with a valveless motor in the same simple manner as with the current design. With the latter you can dismount the cylinder together with the valves without changing anything in the adjustments, and the danger is obviated of getting something changed which you can not yourself readjust as it should be.

"Furthermore, I don't believe it possible to prevent particles of carbon from the lubricating oil lodging in the motor and causing either more rapid wear or a necessity for more frequent cleaning than in the case of the poppet valve motor.

"Just as I have stuck to shaft drive with universal joints, to direct drive and to several other features, uninfluenced by fashion, I feel myself unable to abandon the leather-faced cone clutch. Since 1899 I have used a cone whose apex would be found at about the middle of the transmission box. By this arrangement, which I still consider most practical, the crankshaft is completely relieved of pressures.

"While it may be true that the multiple disc clutch is less exposed to wear than the leather cone, I still ask: Which is better; a construction feature requiring no attention whatever for one to two years and then needing only a new leather facing, or a mechanism which demands frequent attention and lasts forever if it gets it? I prefer a construction with which the chauffeur, if possible, has nothing at all to do so long as the vehicle is in service.

"Since the demand for comfort, in addition to reliability and speed, became general, I have experimented a great deal with spring suspensions and have reached the conclusion that the usual flat leaf springs are altogether satisfactory. But under normal load the springs should be stretched out and not curved, as a stretched spring oscillates more slowly than a curved one and carries the body much more quietly. This is especially of importance for the front springs, because the use of stretched springs there means a minimum longitudinal motion of the front axle. With well designed leaf springs the use of shock absorbers and auxiliary springs is unnecessary.

"Though I was among the first, many years ago, to use wire-spoke wheels on my cars, I have not found them as good as wood wheels. The metal wheel is strong only if made by first-class specialists, and it cannot be repaired offhand. Moreover, the wire spokes are subjected to uncertain strains because they stretch and contract much at changes of temperature. The wood wheel is much more yielding and has a certain springiness in itself. Note also that the Paris cabs which formerly were usually equipped with wire wheels have uniformly gone back to wood wheels. The principal reason for this was the trouble experienced in keeping the wire spokes clean. When the vehicles were cleaned with a hose, water got onto the spoke nipples, and it could not, as in the case of wood wheels, simply be wiped off with a rag or waste. In other words, wire wheels demand more work by the chauffeur, which is against my principles.

"Coming back to the motor, I admit that the fuel efficiency of the slide-valve motor is excellent at the maximum of power de-

velopment. But you cannot run any motor at its maximum without wearing it out much too fast. The average power output must lie far below the maximum, to have reserve power for emergencies as well as for durability. All told, I hold that at the present stage the most advantageous motor to have in one's car is the ordinary type of poppet-valve motor with the valves all on one side, all controlled from a single camshaft, the valves all encased and the camshaft driven by noiseless gears or a chain.

"With regard to the lubricating system, the generally adopted and much praised force-feed circulation of the oil is, in my opinion, wrong. In its circulation the oil is bound to carry along with it minute particles of carbon or detrition material from the cylinders and, however fine-meshed the oil filter is made through which the oil is forced to pass before being used again, it is not possible to avoid some deterioration of the lubricant. Force-feed oiling is also irregular; with a new motor and tight bearings a higher pressure is required to force the oil in between the bearing members than later. And in the case of the crankshaft, the amount of play in the bearings depends largely upon the temperature of the shaft. The extra cost of using oil only once in the motor is insignificant, because the oil used in a circulation system must be thrown away, while that used only once in the motor can be very properly used for the transmission box and the rear axle.

"The so-called unit or block construction, in which the motor and the transmission gear are housed together, I consider illogical, because it results in a construction unit which is too long and rigid for the flexible vehicle frame. It must be suspended at three points, and the load at these points becomes too strongly localized. Furthermore, I consider it advantageous to combine only such elements as never, or at least only at very rare intervals, will require to be taken apart; for which reason I, for example, have taken the distributer out of the magneto and placed it accessibly at the end of the camshaft."—From *Allgemeine Automobil-Zeitung*, Nov. 3.

Mass Production and Science—A substantial connection between the improvement and cheapening of automobiles and the length of the ether wave produced by a certain red light would scarcely suggest itself to the average mind. It is fully established, nevertheless. The mass production of automobiles, as well as of other complicated types of machinery, depends upon the ability of the manufacturer to turn out the component parts by automatic processes and of such superlative accuracy that the very composite product into which they enter may be assembled from them without any recourse to fitting, filing or trying. Parts intended to be alike must be absolutely interchangeable, and this means in many cases that their dimensions must not vary more than one ten-thousandth part of 1 inch; and even less in the case of scientific instruments themselves used for measuring purposes. But it happens that in industrial establishments there is no available standard for controlling the measurements in the first place. All vary more or less with temperature, and some are subject to certain small periodical changes from year to year or month to month, in some manner related to the changes in terrestrial magnetism. The possibility exists that little inaccuracies, almost infinitesimal though they be, may accumulate—one being added to another or even multiplied through an error in methods—until some day they enter into conjunction with some of the unavoidable errors, due to adjustments by human hands or the wear of tools, and cause a series of parts to be turned out which vary just enough from other parts, turned out previously, to interfere with that complete interchangeability which is indispensable and which in Germany has given the whole method its name, i. e. *das Austauschverfahren im Maschinenbau.*

The modern manufacturing methods referred to have been developed chiefly in connection with automobile manufacture in the United States and are now sweeping into other lines of industry and into other countries, mainly Germany. The need of an absolute standard of measurement which would be available in factories has been at once felt and is now being met in a practical manner. It is at this point that the absolute length of a light wave, as determined by pure science, steps in upon the industrial arena and contributes an important share to render it certain that the greatest cheapness in automobiles may be combined with the highest quality and accuracy; namely, by safeguarding the only methods of production by which such a combination may be effected.

The foundation for this advancement was laid when the renowned American physicist Albert A. Michelson, of Chicago, while working at the International Bureau of Weights and Measures at Sèvres near Paris, established as a fact, which has been accepted by science generally, that the wave length of the red cadmium light in dry air and at a temperature of 15 degrees centigrade (hydrogen scale) and a barometric pressure of 760 millimeters, equals exactly 1 meter divided by 1553164.13. This standard which can be reproduced in any suitable laboratory at any time and place has also been adopted as normal for all spectroscopic measurements by the International Union for Solar Research. The micro-measuring machines which work with the length of light waves as a basis for comparison make use of the phenomenon of light interference for measuring purposes and are therefore known as interferometers. They have already found an intensely practical application for determining the components of metallic alloys quantitatively by spectro-analysis. The firm Carl Zeiss, of Jena, Germany, has, for example, lately placed in the market an interferometer designed by Professor Haber for the examination of fluids and gases, and in which the light refraction of the fluid or gas is made the means for a very fine determination of the chemical composition, the method being apparently applicable to solutions in acid of small pieces of test metal.

An explanation with many illustrations of the physical laws which come under consideration in the construction of interferometers intended for the standardizing of linear measurements is given in a serial article on "Machine Building with Interchangeability of Parts" by Dr. Ingenieur R. Crain, appearing in the September, October and November issues of *Werkstattstechnik.*

Non-Ferrous Metal Exposition in London—A show which will be held in Agricultural Hall, Islington, London, May 6 to 18 next, will offer the first public opportunity for passing in review the different metal industries which have nothing to do with iron and steel. Considering the enormous field which has been opened up in this direction through recent scientific progress, it seems remarkable that no one has before contemplated a comprehensive exhibition under one roof of the numerous and varied industrial applications of this relatively new metallurgical knowledge. About fifty different metals are now actually known. The majority of them are still of mainly scientific interest; others are essentially commercial, such as copper, lead, tin, zinc, antimony, gold, silver, platinum. These are the true, the good metals; and their number is gradually increasing at the expense of that of the others. Only a short time ago, vanadium, cerium, radium, iridium, selenium, palladium and several others were chiefly known for their rarity and their uselessness, and now their industrial utilization is widespread. No doubt the exhibition will be widely attended and will be imitated in other countries.—From *La Métallurgie*, Nov. 1.

The Desirability of Having Safe Cylinder Lubrication and yet avoiding partial combustion of the lubricating oil, which leads to smoke and odor in the exhaust as well as to deposits of the unconsumed carbon from the oil, accounts largely for the better results with regard to fuel consumption and regularity in operation which accompany liberal provisions for cooling of the walls of the combustion chamber, though a hot motor in theory should operate most perfectly.

Letters Answered and Discussed

Good Practice

EDITOR THE AUTOMOBILE:

[2,949]—I am enclosing a sketch showing the method I use for holding a patch which is being cemented to an inner tube. A small board is placed above the patch and one below it, and the two are clamped together. Someone told me that this was not a good thing to do, as if the clamp was left on for some time it was likely to crease the rubber, causing the tube to crack. Your opinion as to this will be appreciated. C. F. KEMP.

New York City.

Your sketch has been reproduced in Fig. 1. This method of holding a repair patch is very common, and, as far as we know there is no objection to it. The clamp cannot ordinarily be screwed down hard enough by hand to have any serious results as far as creasing or cracking the casing is concerned.

Cylinder May Not Be Cracked

Editor THE AUTOMOBILE:

[2,950]—I hear that one of the cylinders in an old four-cylinder automobile that I recently bought is cracked and has been

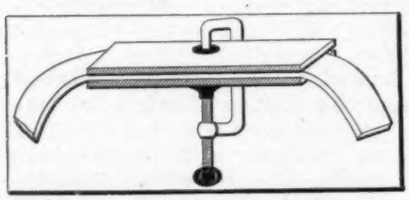


Fig. 1—How to keep a repair patch tight

patched or filled in. I cannot find any trace of the crack, still one of the cylinders does not work all the time. Is there any way in which I can find out which one is cracked, and is there any way to repair it? Also what would be the result if the car is kept running with a cylinder in this condition? Information through THE AUTOMOBILE will be appreciated.

Worcester, Mass. G. N. W.

The probability is that you have no cracked cylinder, and that the cause of the misfiring in one of the cylinders is due to a fouled spark-plug or to defective wiring. However, there are several ways of testing for cylinder cracks, one of them being as follows: Jack up the rear wheels so that they are free to turn, and drive them by the motor, after having first applied the brakes as a load. Run the engine with the timer advanced. If there is a cylinder-leak gas bubbles should issue from it. A leak which is due to a very small imperceptible crack will sometimes not appear until the motor becomes well heated under a heavy load. If you are reasonably certain after cleaning the spark plugs and going over the ignition wiring that you have a cracked cylinder the best course to pursue would be to take down the cylinder (or cylinders, if they are not cast separately) and examine it closely along the wall. To our knowledge, cylinder walls which are cracked cannot be satisfactorily repaired, although cracked jacket walls may be restored by electric welding. Thus it is seen that a crack in the cylinder wall is a rather serious matter, especially when two or more cylinders are cast together.

If, after taking down the suspected cylinder, no crack is perceptible it would be as well to put it back as it is, as the loss of compression due to such an infinitesimal leak will not be appreciable.

There will be no ill effects other than the loss of compression and, hence, loss of power, from running an engine having a cracked cylinder wall. There is the possibility, however, of causing the crack to become larger by continued use, and it is not advisable to run a motor longer than necessary when it has a cylinder in this condition.

The Editor invites subscribers to communicate their automobile troubles and personal experiences, stating them clearly on one side of the paper. If the nature of the case permits, send a sketch, even if it be rough, in order to assist to a clearer understanding. Each communication will receive attention in the order of its receipt, if the writer's signature and address accompany it as an evidence of good faith. If the writer objects to the publication of his name, he may add a nom de plume.

Piston Displacement

Editor THE AUTOMOBILE:

[2,951]—What is and how do you find the piston displacement of an automobile motor? Please answer through the columns of THE AUTOMOBILE. H. B.

Pittston, Pa.

The piston displacement is equal to the cross-sectional area of the inside of the cylinder multiplied by the length of the stroke. This is usually expressed in cubic inches. Referring to Fig. 2, take the diameter or bore d of the cylinder and use it in the formula $\frac{d^2 \times \pi}{4}$ to get the area. Next multiply this result by the length of the stroke l in inches to get the piston displacement. A is the upper limit of travel of the piston face and B the lower.

Wants Information on Ford

Editor THE AUTOMOBILE:

[2,952]—How many revolutions per minute is the maximum of which the Ford model S is capable?

(2) Can you tell me how the Ford model S is geared?

(3) Would it be worth the trouble to drill and tap the cylinders for another independent set of spark-plugs in order to get two simultaneous sparks at different points in the cylinders.

(4) Why is the clutch always placed between the engine and the gearset instead of between the gearset and the differential?

OWNER.

St. Louis, Mo.

(1) Maximum revolutions, 1800 per minute.

(2) High speed, 3 7-11 to 1; low speed, 7 to 1; reverse, 11 to 1.

(3) It would not be worth the trouble.

(4) Because the flywheel offers a convenient housing for it and it would not be good practice to provide the additional weight which would be required by having another heavy housing. In allowing the engine to run free it would be necessary to allow the gears in the gearset to spin around. There are no advantages to be gained in placing it as you mention.

More Ford Points

Editor THE AUTOMOBILE:

[2,953]—(1) It has ben shown that electric headlights can be operated by the excess current generated by the Ford magneto,

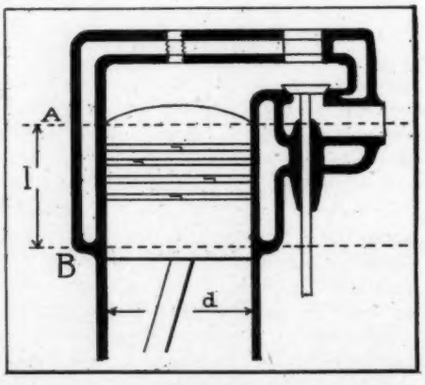


Fig. 2—Djagram illustrating meaning of piston displacement

but when I tried it either misfiring occurred or the motor stopped. Increased engine speed did not affect the misfiring. The lamps were 8-candlepower, 6-volt Tungsten filaments. Can you give me any suggestions as to the trouble?

(2) Are the Ford engine valves constructed so that adjustment of the stems is provided for?

(3) How can I increase the efficiency of the emergency brake, which is internal expanding and unlined? H. L. SHEPARD.

Rochester, N. Y.

(1) The Ford magneto is capable of lighting the headlights, as you state, but you have either wired it up improperly for this service or else you have a double ground in the circuit, caused by improper insulation or a wrong connection. Fig. 3 is a diagram which shows the way in which the headlights and magneto are usually connected on the Ford car. The headlights are wired in series. One wire is connected to a terminal of the magneto, and the other is grounded to the frame of the machine. If your headlights are already wired in series as shown the trouble may be due to the fact that you have connected the wrong terminal to the magneto, causing the double ground already mentioned. In this case the connections A and B should be reversed. It is a question whether or not the 8-candlepower lamps which you are using are the best for the purpose. At high engine speeds the electricity generated for lighting may be sufficient to burn out the filaments. On the other hand, if 10-candlepower lamps are used the current at low speeds may not be sufficient to light them.

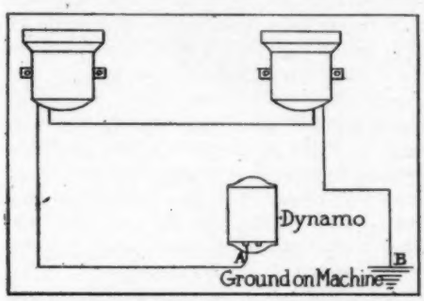


Fig. 3—Wiring diagram for electric headlights on Ford car

(2) There is no provision for adjustment of the valve stems of the Ford motor.

(3) As the expense is very small, the best way to increase the efficiency of emergency brakes is to replace the worn bronze shoes.

Why Experiment?

Editor THE AUTOMOBILE:

[2,954]—In your issue of October 19 you recommend the painting of tires with graphite when laying them up for the winter. Will Dixon's motor graphite answer the purpose? Do you not think that a liberal treatment of sulphur would be just as good? Would you recommend the storing of the tires in a cellar during the winter after either of the above treatments?

Earlsville, Ia. A SUBSCRIBER.

Any good graphite such as that which you mention will do. We have not heard of sulphur being used for the purpose, and hence cannot say as to the advisability of using it. Why experiment with something that has not been tried out and which is more expensive than graphite when the latter has proven satisfactory and is recommended by tire experts? While the use of sulphur might be even beneficial, automobile tires are rather costly articles on which to try the experiment, especially when there is so little to be gained by it.

If the cellar is not damp and has an even temperature around 50 degrees Fahrenheit no better place could be found in which to store the tires.

Prefers Broken Crankshaft

Editor THE AUTOMOBILE:

[2,955]—I have been surprised to notice that no exception has been taken to the statement that starting on the spark is detrimental to the motor.

As is well known, the explosive force of a gasoline mixture at atmospheric pressure is very low. That is why a compression of 50 to 60 pounds is used to give an engine power. Now an engine coming to a stop generally oscillates and finally stops with the pistons in a mid-stroke position, which means a low compression pressure. Furthermore a practical test by opening the petcocks after the engine has been standing for a few minutes will usually demonstrate that the amount of pressure remaining in the cylinders is a negligable quantity. This low compression, in connection with a half-condensed, slow burning mixture of gasoline vapor, makes it evident that the pressures and strains produced by starting on the spark must necessarily be much less than those incidental to the normal operation of the engine.

Is not a broken connecting rod or crankshaft cheaper than a broken arm?

Allegheny, Pa. MURRAY FAHNESTOCK.

Conceding the point that a broken crankshaft is in many respects less troublesome than a broken arm, but denying the necessity of either, we still maintain the inadvisability of starting on spark. The inertia of the stationary parts creates strains on the suddenly started mechanism which are far beyond those incurred in actual running or in starting either by hand or by automatic cranking.

Other Factors to Consider

Editor THE AUTOMOBILE:

[2,956]—Will you kindly tell a few other of your readers and myself where the discrepancy occurs in the ratings of the Vanderbilt Cup entries. For instance, the Mercedes has a bore of 5.1 inches, a stroke of 7.1 inches, a displacement of 579 cubic inches and 90 horsepower, while the Fiat has a 5-inch bore, a 7.48-inch stroke, a displacement of 588 cubic inches and 70 horsepower. Here are two cars, one having less bore and longer stroke than the other, yet with such vastly different horsepowers. Will you kindly explain?

ALFRED P. STEWART.

Charleroi, Pa.

Other factors besides the bore and stroke enter into the horsepower rating of a motor. The speed and compression pressure must also be taken into account. On page 1005 of our issue of December 7 you will find an explanation of this same point.

Direction of Cooling-water Flow

Editor THE AUTOMOBILE:

[2,957]—Will you kindly tell me the direction of flow of the cooling-water? Does it flow in at the top of the radiator and out the bottom, or vice versa? Also please tell me where in the cooling-water circuit the pump is placed?

Memphis, Tenn. A. L. CROSS.

The arrows in Fig. 4 show the direction of flow of water through the cooling system. The water enters the radiator at the top and flows out at the bottom. The pump is located as shown, between the manifold which admits the water to the jackets and the outlet pipe from the radiator.

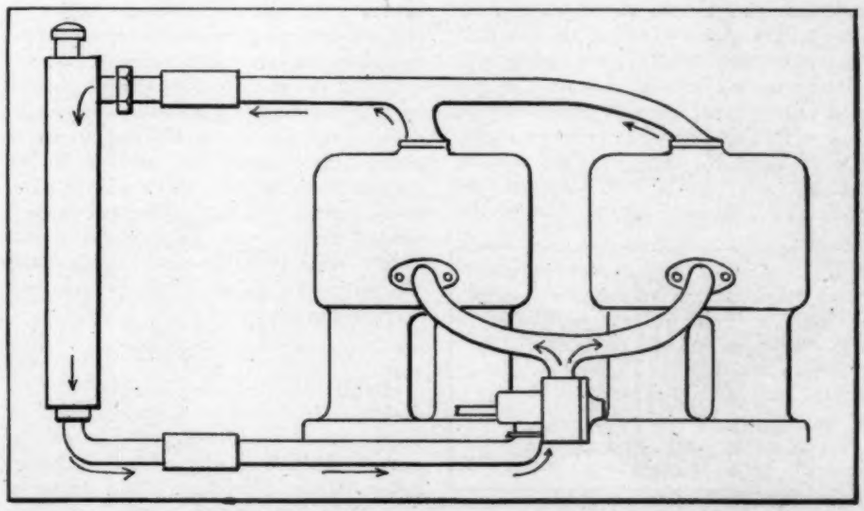


Fig. 4—Illustrating direction of water flow in cooling gasoline motor

Little Bits of Motor Wisdom

Pertinent Pointers of Interest to Repairman and Driver

REPAIR OF BROKEN SPRINGS—To the automobilist who has smooth, level roads on which to drive his car and to careful drivers, spring troubles are practically unknown. But in hilly localities and in places where the roads are rough mishaps to springs are not an uncommon occurrence. Springs are often broken by sudden jolts due to driving the car at a high rate of speed over rough roads where there are deep ruts and where the approaches to culverts are not properly graded. Accidents of this kind are usually due to carelessness in overloading the car and in driving, but, nevertheless, they do happen, and a few suggestions as to temporary spring repairs will not be amiss.

A break in the upper leaf is most common, the part nearest the hanger usually being bent upward. At A, Fig. 2, is shown a rather makeshift but effective spring repair for a break of tnis nature. If you are on the road when such a mishap occurs and have no spring clips or extra pieces of spring leaf at hand, this emergency repair will prove very satisfactory. The car should be first jacked up, the jack being placed at the end of the hanger. This will serve to relieve the tension on the under leaf and will bring the bent or broken upper leaf down somewhat. Next take a wrench and adjust its jaws so that they are far enough apart to go over the spring leaves at the point nearest the hanger. Then drive the wrench along the leaves toward the break, using a hammer and cold chisel (or other piece of steel) if necessary. This will serve to bring the bent upper leaf nearly down to its original position against the lower leaf. Next take a piece of hard wood about a foot long and shape it to the width of the spring leaves, as shown. Bind this block down firmly to the spring with whatever strong wire is at hand. It is a good plan to wind tightly over this wire a piece of clothes line rope, or other strong rope of about the same size, and then to wet the rope, causing it to contract, thus binding the joint very tightly. The wrench can now be removed, and the spring, though weak, will be found to be quite strongly repaired.

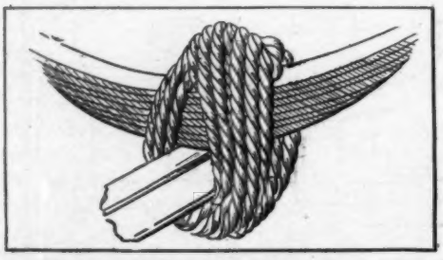


Fig. 1—An improvised bumper

The repair above outlined can be made use of when no spring clips or extra pieces of spring plates are to be had. When using a car on rough roads, it is well to include these things in the repair kit. A spring clip is shown at B, Fig. 2, and another and better way of repairing a broken spring leaf is seen at C. This repair is very satisfactory, and the car can be used with a spring fixed in this way until such time as the broken member can be conveniently replaced.

The piece of spring steel is first placed over the break, as shown, and the clips are then slipped on. Small blocks of hard wood are placed on the under side and the lower plates of the clips are bolted on over them. The particular advantage of this repair lies in the fact that the parts of the broken leaf can be readily brought down into their normal positions against the next lower leaf simply by tightening up on the nuts. For further strengthening, one or two more clips may be added, blocking them on the bottom in the same manner.

Of course, a repaired spring will not be as strong as the others, and for this reason it is likely to bump the frame whenever the car is jolted. If the car is not fitted with rubber bumpers or shock absorbers it is a good idea to place a block of wood at the spring center and bind it on with as many parallel turns of heavy rope as possible. This improvised form of bumper is shown by Fig. 1. This will serve to soften the impact, reducing the jarring of the frame and preventing it from becoming localized. When a garage or accessory station is reached this rope bumper should be replaced by a more suitable rubber one.

Any of the good forms of shock absorbers on the market materially reduce the chances for spring breaks, and wherever possible they should be included in the equipment of the car. Their cost is small in comparison with the trouble and expense incident to the repair of a broken spring. This is aside from the easier riding qualities which a full set of shock absorbers gives to the car.

HORSEPOWER RATINGS—Considerable confusion exists among automobilists and others as to the distinction between the various methods of determining the horsepower ratings of motors. As a matter of fact, there is a very large distinction between these methods, even though a great many persons do not appreciate it. Because a manufacturer states that the (A. L. A. M.) rating of his engine is a certain horsepower it does not necessarily follow that the actual horsepower which the motor will deliver on a brake test will correspond with his rating. Most manufacturers rate their motors according to the A. L. A. M. standard. The formula which this body has set down states that the horsepower shall equal the product of the square of the cylinder diameter multiplied by the number of cylinders which the motor has, and this result divided by the constant 2.5. This latter figure is used because it is "based on the average view of the A. L. A. M. engineers as to a fair conservative rating for a four-cycle motor at one thousand feet per minute piston speed." Motors rated according to this standard are usually given a horsepower much below

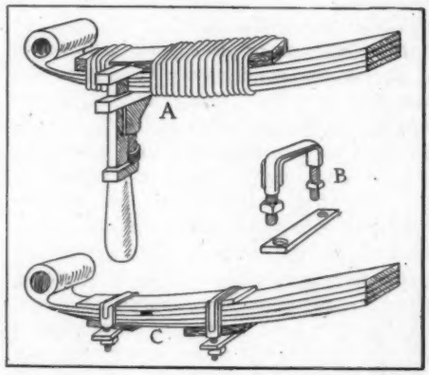


Fig. 2—Two good spring repairs and a form of spring clip

that which they are capable of developing under load. The formula does not take into account the compression pressure nor does it make use of the piston displacement, both of which factors are considered when the horsepower is determined by more accurate methods. The A. L. A. M. standard is of use for commercial purposes only in that it affords a means of comparing automobile motors as to power, but not as to the exact amount of this power. Thus, we say a certain car has 20 horsepower, according to A. L. A. M. rating, and another, 30 horsepower. The actual horsepowers may be around 30 and 40, respectively, but so far as the comparison of the two motors as to relative power goes, the more approximate rating answers the purpose equally as well as the other. Frequently we are asked to explain wherein the discrepancy lies between the

engine ratings of various racing cars as set forth by the entry tables. Often two cars of nearly the same piston displacement are entered with widely different horsepowers, and this leads to a great deal of confusion in the minds of many. This horsepower difference is usually due to the variation in the design of the motors. It may also be due to the fact that either one of the cars or both have not been rated according to the A. L. A. M. standard, unless the only variables, the cylinder diameters, are far enough apart to make up for the difference. That is, if two motors have four cylinders each, in the A. L. A. M. formula $\frac{D^2N}{2.5}$ the only factor which can cause the variation is D^2, which is the square of the cylinder diameter. N represents the number of cylinders. Therefore, even though the piston displacements of the two may be about the same, in one case this may be made up by a long stroke and a small bore, while in the other the cylinder diameter may be large and the stroke short. Thus, the bores are not the same, consequently the ratings by this formula cannot be the same. A specific example will no doubt serve to illustrate this more clearly. Take, for instance, two four-cylinder motors, one having a bore of 5 inches and a stroke of 4 inches, and another having a bore of 4 inches and a 6 1-4-inch stroke. Each motor has a total piston displacement for the four cylinders of approximately 314 cubic inches, yet by substituting in the formula already given the motor with the 5-inch bore receives a rating of 40 horsepower, while the other figures out to be 25.6 horsepower. Of course, the piston speed is vastly different in the two cases, and it is unfair to use the constant 2.5, which is based on one thousand feet per minute piston speed, to compute both horsepowers. While the formula is very poor at best, it is seen to be absolutely worthless, unless the constant is changed to meet the specific conditions.

Another more nearly accurate and consistent way for getting at the power of a motor is by means of the indicated horsepower formula, which states that the latter is equal to the expression $\frac{(M.E.P.)\,lan}{33000}$. In this formula l is the stroke in feet, a is the area of the piston face in square inches, n is the number of explosions per minute (usually considered as being half the number of revolutions per minute) and M. E. P. is the "mean effective pressure" acting within the cylinder throughout the cycle. The only difficulty arises in determining the last-named factor. It must be determined from an "indicator card" taken while the engine is running under load. For taking this card an indicator must be used. There are several types of these instruments on the market, one of them (Thompson) being shown in section by Fig. 3. The pointer traces on a paper attached to the drum, a diagram having pressure and volume co-ordinates in proportion to the actual pressures for the various volumes or positions of the piston throughout the entire cycle. This diagram is integrated—that is, its area is determined by planimeter or by computation, and, after taking into account the scale of the indicator spring, the mean effective pressure is determined by dividing the equivalent area by the length of the stroke.

For testing an automobile engine the indicator may be attached to the cylinder by screwing it into the priming cock hole. Cards need be taken on one cylinder only, and the result obtained by the above formula can then be multiplied by the number of cylinders to get the total power of the motor. It is sufficiently accurate to assume that each cylinder furnishes a proportionate part of the total developed.

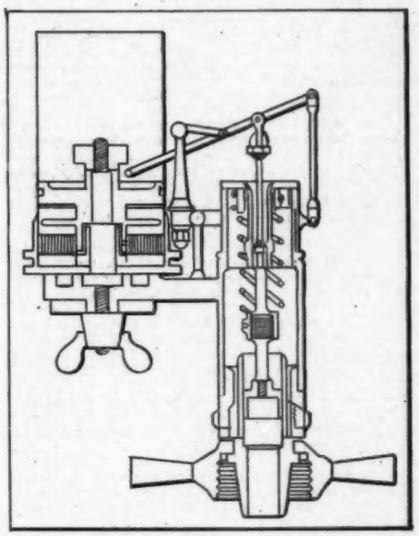


Fig. 3—A type of indicator to measure mean effective pressure within a cylinder

Perhaps the best method of getting at the horsepower output of a motor is by means of a Prony brake. The apparatus may be fitted up as shown by Fig. 4. The test can only be performed when the motor has been removed from the frame and mounted on some sort of testing block, such as is used in the garage. The Prony brake proper is shown by B. The strap D is put around the flywheel C, and its tension is regulated by means of the handwheel or other adjusting screw A. The end of the brake beam bears on the block E which, in turn, rests on the platform F of the scales. The motor is started running and the load applied by tightening up on the adjusting screw, the direction of rotation being as shown. To get the maximum brake horsepower of the motor the screw A is turned until the friction is barely overcome—that is, until the motor is running under such a load that a slight additional tightening of the strap D will stop it. When this adjustment is reached the friction is weighed by the platform scales, and the speed is noted with a tachometer or speed-counter. These readings should be taken, of course, when the motor is developing all the power of which it is capable.

Having obtained this data, the following formula is applied:

$$\text{Brake horsepower} = \frac{2\pi GAN}{33000}$$

The symbol π, of course, represents the constant 3.14, while G is the weight shown by the scales, A is the length of the brake arm in feet from the center of the flywheel to the center of the block E, and N is the number of revolutions per minute of the flywheel as obtained by means of the speed-counter.

When the test is properly carried out it gives a very near approach to the correct power output of a motor.

Another method of testing which is made use of chiefly by manufacturers is to direct-connect the motor under test to an electric generator, causing it to drive the generator and noting the electrical output in watts. The watt output can then be reduced to horsepower. This equivalent horsepower comes very near to the correct delivery of the motor, although it is slightly less than it should be unless the efficiency of the electric generator is taken into account.

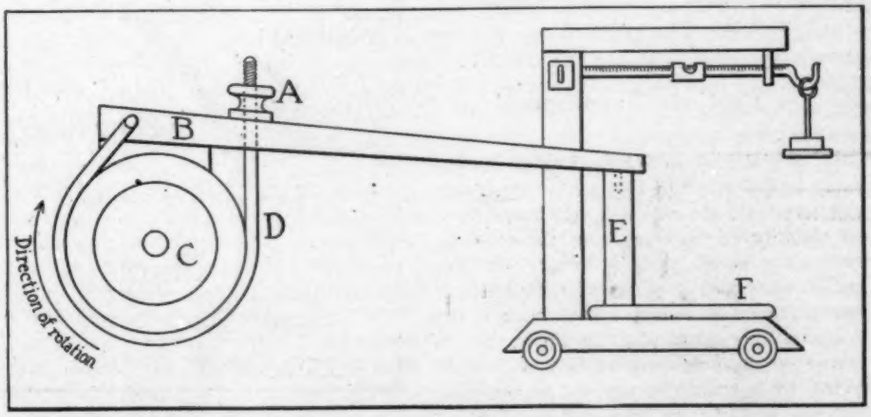


Fig. 4—Apparatus for making a brake test

My Best Automobile Repair

Some Quick Repairs Made in the Garage and on the Road

An Effective Lock

EDITOR THE AUTOMOBILE:

Several lock devices have been gotten out to prevent the automobile motor from being started by anyone except the person who is in possession of the key and they are all more or less practical. This provision is oftentimes very necessary when the car is allowed to stand for some time on a busy street with no one to watch it. Very often a car has been stolen at night by thieves who are able to start the motor by simply switching on the ignition current. I have never had any trouble of this kind, but I believe in the ounce of prevention and am sending you a sketch of the way in which I prevent the car from being used without my knowledge. Inside the battery box I have fastened a switch of the type used in electric light circuits. Fig. 1 shows a section through the box. The switch is seen fastened to the back of this box. If the box is of metal, a board can be fastened inside to its back and the switch then screwed on to this board. The switch is simply put in one of the wires leading from the battery, as shown. When the driver is to leave the car for some time the switch is turned off and the battery box locked.

It is safe to say that the thief or joyrider would give up the attempt to make away with the car when he found that he was unable to start it by switching on the current. Even if the battery box were not locked, he would hardly risk further investigation into the reasons for the motor's failure to run.

If the car is kept in a public garage, some such device as this gives the owner a feeling of satisfaction in knowing that there is no chance of his machine being taken out and possibly damaged by the garage employees. CAREFUL MOTORIST.

Philadelphia, Pa.

Protects Terminals

Editor THE AUTOMOBILE:

A useful hint to some of your readers may be gained from Fig. 2. On most cars all terminals are exposed, and hence there is liability of leakage from them to the adjoining metal parts. To prevent this, one way is to slip pieces of rubber tubing over them, as shown. This applies not only to the spark plug terminals, but to those on the magneto and battery as well. This tubing also serves to prevent the jarring loose of the connections. Nothing is more annoying when on the road than to have the motor stop for no apparent reason at all, and after going over half its parts to find no more serious a trouble than that a connection has jarred loose from its terminal. If the tubing does not readily slip over the terminals or plugs, it may usually be made to go on easier by wetting it slightly. B. L. BARNES.

New York City.

Temporary automobile repairs made by the driver or owner while on the road and permanent repairs made in the garage after the run is over, are interesting to all automobile owners.

It may be a spring leaf has broken; a shackle bolt or strap may break; a steering tie rod is bent; the car skids into a curb and bends a steering arm or the starting crank; a throttle or magneto connection breaks owing to vibration; a radiator leak is started by a stone or some other means; a leak in the gasoline tank is discovered; there is a small hole in the gasoline feed line; a brake facing may burn out; a brake connection breaks; a front axle gets slightly sprung; a clutch starts slipping, or any one of a thousand things may happen.

Every automobile owner is interested in knowing how repairs have been made, how long it took to make them, how much they cost, and by whom they were made.

We want you to write in simple language in a letter what repair of this nature you have had to make, how you made it, how long it took you and how much it cost.

You can make with your lead pencil one or two rough sketches indicating the broken or damaged part and showing how the repair was made.

The experience of each reader is interesting to every other reader. Analyze your past experiences and send in one or two of them.

Give your name and address, legibly written. If you do not want your name to appear, make use of a nom de plume.

Editor THE AUTOMOBILE.

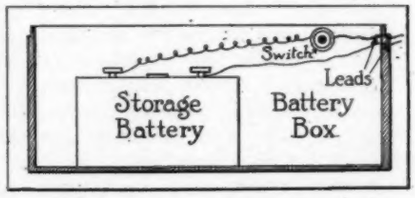


Fig. 1—Battery box switch

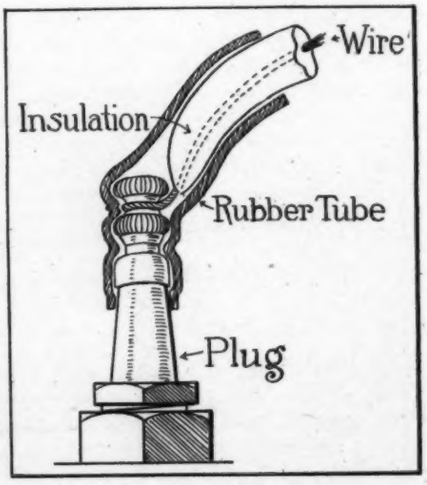


Fig. 2—Terminal protection

Need of Safety Cranks

Editor THE AUTOMOBILE:

Just the other day I read in the paper of another broken arm as the result of trying to start a motor with the old-fashioned starting crank. There are on the market a number of safety cranking devices, which are made so as to be applicable to any car, yet the majority of automobilists still persist in using the old-style crank when one of the newer and safer ones could be added at small expense. Since having one of these put on my car I do not have the former guilty feeling when a friend cranks the motor for me. V. L. GASS.

Boston, Mass.

Product of a Fertile Brain

Editor THE AUTOMOBILE:

While this is not exactly to be classed as a repair, I think the suggestion might be of service to some other automobilist when he is out in the country sometime, and, after it starts to get dark, he discovers that the acetylene supply in his tank is very low. In fact, that is about what happened to me the other night. About dark I started out blissfully for a run in the country, and when I had gone perhaps 15 miles the headlights began to get dim, and finally went out. I was seriously considering abandoning the car for the night when I saw the lights of a country store shining dimly, perhaps 100 yards up the road. This gave me an idea, and I walked ahead to the emporium. There I bought two candles and begged a generous supply of string. Returning to the car, I tied a candle firmly to each gas jet and lit the candles. To my great joy, the light furnished by these old-fashioned articles when the reflectors were properly focused, was bright enough to enable me to proceed slowly, but none the less safely, to the nearest gas supply station. Now I carry a few candles as part of my car's equipment.

Yonkers, N. Y. J. C. HARRIS.

My Ideal 1912 Automobile

Readers' Conceptions of What Next Year's Car Should Be

Readers continue to demonstrate their interest in the ideal car and the specifications which are submitted show a wide range of taste and requirements. In view of the interest shown the Editor continues to extend the invitation to all who entertain ideas on this absorbing topic to submit their opinions for publication. The description should be legibly written on one side of the paper and signed by the sender, although if it is so desired the name will not be published.

A Long-Stroke Advocate

EDITOR THE AUTOMOBILE:

I have read with no little interest the articles on My Ideal Automobile and have decided to outline the car which I would like to own for 1912.

The motor should be of the four-cylinder, four-cycle, T-head type. The cylinders should be cast in pairs with a bore of 4 3-4 inches and a stroke of 7 1-2 inches. This should give a motor of about 60 brake horsepower. The electric current should come from a Bosch dual system, and the cooling should be by a honeycomb radiator and a gear-driven centrifugal pump. Oil should be supplied by a splash system and by a pump which would force the oil through a hollow crankshaft to the main bearings of the motor. The carbureter should be a G. & A. and a B. & L. Castor front axle should be included. The rear axle should be of the floating type, manufactured by Timken. The wheelbase should be about 130 to 134 inches, and the car should be equipped with 38-inch by 5-inch tires all around.

The steering gear should be similar to that used in the Marmon 32. The transmission should have four forward speeds and a reverse, with direct drive on the fourth speed, geared two to one. The springs should be semi-elliptic front and rear. The clutch should be a large cone with cork inserts.

I would have a roadster type of body, seating two, with large gasoline and oil tanks placed behind the seat.

I should think that a car such as I have outlined could be made to sell for about $2,750 or $3,000 and yet be built from the best of materials. GEORGE BRIGGS.

Sheffield, Mass.

Wants High-Powered Car

Editor THE AUTOMOBILE:

My ideal 1912 automobile would have a horsepower around 80, the engine bore would be 5 inches and the stroke 7 inches. There would be six cylinders, cast in pairs, with water cooling and T-heads. The ignition would be by Bosch dual system with governor control. Lubrication would be by force-feed to all bearings and by independent splash. There would be oil level cocks and drain plugs to all crank pits, gearcases, inclusive of transmission and differential housings, with generous oil holes.

The clutch would be multiple disc with 52 steel plates running in oil and with a generous carrier. The transmission would be of the four-speed selective type with the following gear ratios: 1, 9 to 1; 2, 5 to 1; 3, 3 to 1; 4, 2 1-4 to 1; reverse, 9 to 1. The drive would be by shaft and the universal housings would be grease tight. I would have semi-elliptic springs on the front and platform springs on the rear. The wheelbase would be 135 inches and the tires would be 37 inches by 5 inches. The rear axle would be floating with Hess-Bright bearings, and the front one would be tubular, hot-riveted with Timken bearings. The control would be by foot and hand throttle with a cut-out button on the wheel. For brakes I would use two expanding and two Raymond contracting on the rear wheels.

The features of the body would be a seven-passenger, fore-door, straight-line body with plenty of leg room for all seats. full spring, hand-buffed, hair-filled leather seats, 30-gallon gas tank under pressure under the front seat, tool box at the rear, cowl dash, self-locking door catches.

The equipment would include a self-starter, Gray and Davis full electric light system, Warner clock and speedometer, Banker windshield, pressure, volt and ammeter gauges, oil sights, Continental quick-detachable, demountable rims with two extra rims carried at the rear of the body in a special cradle fastened to the rear from a cross piece, Goodrich tires carried in a metal trunk along with tubes, jack and pump, storage battery to be carried under the rear seat, all wires leading from it to run in lead conduits. The object would be to keep the running boards free from all boxes or tanks.

The top would be of the best mohair, five-bow, strap-hung. The cushions and tire covers would be of the same material. The top of the frame would not be over 25 inches from the ground, and the seats would be comfortably low.

The weight of the car would not be over 4,000 pounds and its price would be somewhere around $5,000. F. E. D.

Haverhill, Mass.

Co-operative Manufacture

Editor THE AUTOMOBILE:

Many of your readers have described their ideal cars for 1912. From the size of the cars desired, most of the descriptions seem to come from married men with large families.

My needs would be better filled by a small car—a dependable runabout. I prefer a two-cylinder car to many of the fours which have a stroke barely in the plurality of inches. Many experts have spoken in favor of the two-cylinder engine for cars of 20 horsepower and below. Therefore, let the engine have two cylinders, opposed, under the hood, with a bore of 4 3-4 inches and a 5-inch stroke. This would give full 18 to 20 horsepower, if properly constructed.

The hood should be of the Renault pattern, well raised. The transmission should have three speeds, of course, and selective; geared three to one, but with the low so low that the engine would pull a full 30 horsepower on hills. The clutch should be of the multiple-disc type with enough plates to avoid grabbing, and the wheels should be 34 inches in diameter with 3 1-2-inch tires. I would put an 18-gallon gasoline tank under the seat, and make a large tight-closing carrying space in the rear.

This runabout would be primarily for two passengers, but the seat should be made undivided and large enough for three in a pinch. The tool box should be put on sturdy running boards, and enough of the inner side of the front mudguards should be clipped out to give the driver a clear view of the front rims. Mud will not spray through this aperture to any extent, and it is a great convenience to see just exactly where you are driving the front wheels in tight places.

A manufacturer making such a runabout of good materials with the best grade of workmanship, selling it direct to buyers and giving 5 per cent. off on club orders of three or four, and 7 per cent. off on those of five or more, ought to make a good profit at $500 for each car. In one active season, without exaggerating the intended output, the maker ought to sell 15,000 of these machines. The price could then be lowered 20 per cent. and at least 20,000 more such runabouts sold with but little advertising.

The apples of profit in the co-operative field of automobile making are as ready for plucking as was the over-ripe fruit in the garden of the Hesperides.

Seattle, Wash. S. ROSS PARKER.

Automobile Metallurgy Made Easy

By E. F. Lake

Part IV
Torsional Strains

THERE are many parts of an automobile which are submitted to torsional strains, that is, twisting strains. While it is possible to get from the tensile strength, elongation, etc., an idea of the torsional strains a metal will stand, these do not tell the whole story. Steel might show a good resistance against being pulled apart and thus have a high tensile strength, and yet not be tough enough to withstand high twisting or torsional strains. On the other hand, a steel might only have a medium tensile strength and still withstand very high torsional strains.

In the tensile testing machine the molecules of the mass are separated by being pulled away from one another in a straight line, while in the torsional strains these molecules must slide past one another until their cohesive force has been destroyed enough for the metal to break. Cylindrical pieces A, B, C and D in Fig. 1, show the manner in which torsional strains affect materials. The fine lines in A outline a plane, from the center to the circumference of a round bar before it is twisted or torsional strains are applied. Piece B shows the position this same plane occupies when the bar has been twisted. Piece C shows an elementary sector of this same round bar before being twisted, and D shows it after it has been twisted. These latter two illustrate the manner in which the particles of the mass must slide by one another when a material is given a torsional strain. Toughness, hardness, ductility, density and cohesion are all factors that affect the torsional strains that materials will withstand.

Many of the most vital parts of an automobile are submitted to these torsional strains and hence torsion tests are of nearly as much importance as those for tensile strength, elastic limit, elongation and reduction of area. They are made on a different machine, however, and consequently many rely on the tensile test to indicate what the metals will stand. The crankshaft of the engine, in particular, is given a sudden torsional strain every time an explosion occurs in one of the engine cylinders and when a car is moving this occurs almost continually. From there the torsional strain is transmitted to the different shafts in the gearbox. It is then transmitted through the

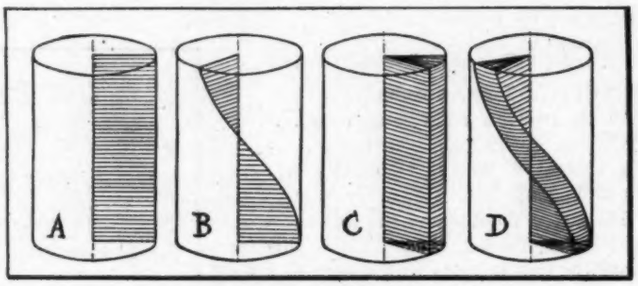


Fig. 1—How torsional strains affect materials

universal joint to the driving shafts and mechanism of the rear axle. Where the chain and sprocket are used for transmitting the power to the rear wheels the strain may follow a little different course but the principle is the same and it affects nearly all driving parts between the crankshaft of the engine and the rear wheels.

The camshaft is submitted to slight torsional strains as well as all other parts that revolve. When driving a car over a rough road, the front axle is also submitted to torsional strains. Here, however, the strains alternate back and forth in opposite directions, an effect which is not produced in any of the revolving shafts of the mechanism. True, the backing up of a car causes torsional strains to be delivered to the driving parts in an opposite direction to that transmitted when it is being driven ahead. This, however, is not the sudden change in direction that takes place in the front axle and, consequently, can be ignored. Likewise, the frame is submitted to this twisting strain that suddenly changes in direction.

As these torsional strains affect all of the important moving parts of a car, as well as the frame, front axle, etc., they are factors that should not be ignored in the testing of materials and the tensile strength should not be taken as an indication of a material's resistance to torsional strains. The torsional resistance varies greatly in the various metals used. Cast iron is a hard, brittle metal and resists torsional strains very poorly. Aluminum, on the other hand, is comparatively soft and plastic and this also resists only slight torsional strains. Both of these metals however, are lacking in toughness, density and cohesive force, which may account for their low torsion.

Brass will show a higher torsion than either of these but yet is not a metal that is high in torsional strength and hence should not be submitted to such strains. Some of the bronzes are very tough and will withstand very high torsional strains. Notable examples of these are manganese and tobin bronze.

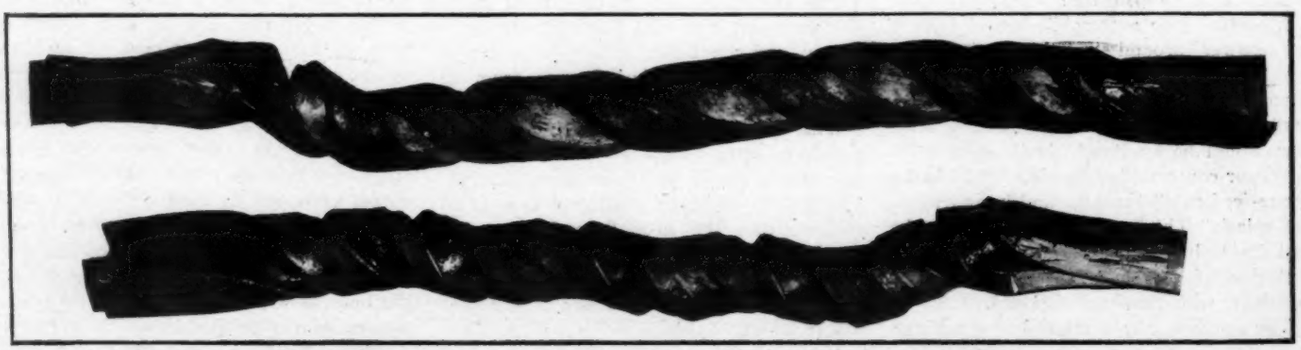


Fig. 2.—Specimens of automobile front axles after the torsion test has been applied

Steel has a higher resistance to torsional strains than any of the other metals and, consequently, it is used for the important parts that have to withstand such strains. There is, however, a great difference in steels and some do not have as great a torsional strength as the bronzes mentioned. The two specimens of front axles that are shown in Fig. 2 give a good illustration of this.

The lower axle was made from low carbon steel and when a torsional strain of 15,700 pounds per square inch was applied it twisted through four and one-half complete revolutions in its length of 24 1-2 inches; the elastic limit of torsion occurred at 3,500 inch pounds.

The upper axle was made from one of the special alloy steels often used in automobile construction and when a torsional strain of 30,700 pounds per square inch was applied, it only twisted through three and one-half complete revolutions in the same 24 1-2 inches of length. The elastic limit of torsion in this latter axle was not reached until 7,540 inch pounds had been applied. It will thus be seen that the high grade alloy steel had double the torsional properties possessed by the low carbon steel.

Like the other strength properties, torsion is greatly affected by heat-treating steel. If steel is heated to a high temperature and suddenly quenched in water or brine, its toughness is gone and it is very brittle. Its resistance to torsion therefore would be very low. On the other hand, if this hardness and its resultant brittleness were reduced by tempering the steel, that is, reheating it to comparatively low temperatures and then cooling it, its torsional resistance will be greatly increased. Some of the alloy steels, such as nickel chrome, will give very high torsional resistance figures when they have been properly heat-treated.

A Real Rubber Solution—In the *Moniteur Scientifique* for September F. Ahrens indicates the means for obtaining true and highly adhesive solutions of rubber. In the so-called solutions of rubber in benzine, gasoline, benzol and toluene the rubber is only swollen, and merely a colloidal suspension is produced which, thrown on a filter, immediately separates into its two constituents, *viz.*, the colloid and the fluid which causes it to swell. By employing raw Para rubber and operating under certain conditions which the author indicates solutions which are very binding and of high viscosity are obtained, and the rubber conserves its original structure almost completely. But if it is triturated the solution becomes much more subject to oxidation and loses some of its adhesive property.

By employing amyl acetate as a solvent and treating very thin slices of cleaned and skinned Para, the author has succeeded in obtaining true solutions which will pass through an ordinary paper filter without assistance from suction or pressure, though very slowly. The filtered fluid is of amber color and its fluidity it like that of castor oil.—From *Le Génie Civil*, November 25.

Oxy-Gasoline Flame for Welding and Soldering—According to a somewhat indefinite report, gasoline, benzol, kerosene or alcohol may handily be used in the place of acetylene gas for autogenous welding or for soft soldering. To this end, the oxygen generator is simply connected by pipe or hose with a tank containing one of the fluids mentioned, and from it the gas mixture is piped under pressure to the burner, where, the report says, it is heated by means of a small lamp. The flame is rather large, it is admitted, but the purity of the gas excludes all clogging of the nozzle, while the fuel is more universally obtainable than acetylene or hydrogen and considerably cheaper.—From *Metall-Technik*, October 7.

Calendar of Coming Events

Shows

Dec. 30-Jan. 6.....Buffalo, N. Y., Annual Show, Seventy-fourth Regiment Armory, Buffalo Automobile Trade Association.
Jan. 2-11.....New York City, Hotel Astor, Importers' Salon.
Jan. 6-13.....New York City, Madison Square Garden, Twelfth Annual Show, Pleasure Car Division, Automobile Board of Trade.
Jan. 6-20.....New York City, Madison Square Garden, Annual Show, Motor and Accessory Manufacturers.
Jan. 10-17.....New York City, Grand Central Palace, Twelfth Annual Show, National Association of Automobile Manufacturers; also Motor and Accessory Manufacturers.
Jan. 13-19.....Milwaukee, Wis., Auditorium, Fourth Annual Show, Milwaukee Automobile Dealers' Association
Jan. 13-27.....Philadelphia, Annual Show, First and Third Regiment Armories, Philadelphia Automobile Trade Association.
Jan. 15-20.....New York City, Madison Square Garden, Twelfth Annual Show, Commercial Division, Automobile Board of Trade.
Jan. 15-20.....Toledo, O., Annual Show, Terminal Building, Toledo Automobile Dealers' Association.
Jan. 22-27.....Rochester, N. Y., Annual Show, State Armory, Rochester Automobile Dealers' Association.
Jan. 22-27.....Detroit, Mich., Wayne Gardens, Eleventh Annual Show, Detroit Automobile Dealers' Association.
Jan. 22-27.....Providence, R. I., Providence State Armory, Rhode Island Licensed Automobile Dealers' Association, Automobile and Accessories Show.
Jan. 27-Feb. 10....Chicago Coliseum, Eleventh Annual Automobile Show under the auspices of the National Association of Automobile Manufacturers. Pleasure cars, first week. Commercial vehicles, second week.
Jan. 27-Feb. 10....Pittsburgh, Pa., Sixth Annual Show, Automobile Dealers' Association of Pittsburgh, Inc. Pleasure cars, first week. Commercial vehicles, second week.
Jan. 29-Feb. 3.....Scranton, Pa., 13th Regiment Armory, Second Annual Show.
Feb. 1-7.....Washington, D. C., Annual Show, Convention Hall.
Feb. 3-10.....Montreal, Canada, National Show, Drill Hall, Automobile Club of Canada.
Feb. 5-17.....St. Louis, Mo., Coliseum, Annual Show, Pleasure cars, first week. Commercial vehicles, second week.
Feb. 12-17.....Ottawa, Ont., Howick Hall, Annual Show, Ottawa Valley Motor Car Association.
Feb. 12-17.....Kansas City, Mo., Annual Show, Combined Association of Motor Car Dealers.
Feb. 14-17.....Grand Rapids, Mich., Third Annual Show.
Feb. 17-24.....Pittsburgh, Pa., Second Annual Show, Exposition bldg., Pittsburgh Auto Show Association, Inc.
Feb. 17-24.....Newark, N. J., Fifth Annual Automobile Show, New Jersey Automobile Exhibition Company, First Regiment Armory.
Feb. 17-24.....Minneapolis, Minn., National Guard Armory and Coliseum, Annual Automobile Show, Minneapolis Automobile Show Association.
Feb. 19-24.....Omaha, Neb., Seventh Annual Show, Auditorium, Omaha Automobile Show Association.
Feb. 19-24.....Hartford, Conn., Annual Show, Automobile Club of Hartford, State Armory.
Feb. 19-24.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 20-24.....Binghamton, N. Y., State Armory, Third Annual Show, Automobile Dealers' Association.
Feb. 20-28.....Baltimore, Md., Annual Show, Baltimore Automobile Dealers' Association.
Feb. 21-24.....Louisville, Ky., Fifth Annual Show, First Regiment Armory, Louisville Automobile Dealers' Association.
Feb. 21-28.....Toronto, Ont., Annual Show, The Armouries, Toronto Automobile Trade Association.
Feb. 24-March 2...Brooklyn, N. Y., Twenty-third Regiment Armory, Annual Show, Brooklyn Motor Vehicle Dealers' Association.
Feb. 26-Mar. 2.....Elmira, N. Y., Second Annual Show, Elmira Automobile Club.
Feb. 26-Mar. 2.....Paterson, N. J., Annual Show, Fifth Regt. Armory, Paterson Automobile Trade Association.
Feb. 28-Mar. 2.....Davenport, Iowa, Annual Show, Davenport Automobile Association.
March 2-9.....Boston, Mass., Tenth Annual Show, Boston Automobile Dealers' Association, Inc.
March 4-9.....Denver, Col., Auditorium, Annual Show.
March 4-9.....Denver, Col., Annual Show, Auditorium, Motor Field.
March 6-9.....Tiffin, O., Second Annual Show, The *Advertiser*.
March 12-16.....Syracuse, N. Y., Fourth Annual Show, State Armory, Syracuse Automobile Dealers' Association.

Meetings, Etc.

Dec. 20.....New York City, Waldorf-Astoria, Annual Banquet of the Automobile Club of America.
Jan. 18-20.....New York City, Annual Meeting of the Society of Automobile Engineers.

Race Meets, Hill-Climbs, Etc.

Dec. 25-26.....Los Angeles, Cal., Track Races, Motordome.

THE AUTOMOBILE

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THE CLASS JOURNAL COMPANY

H. M. SWETLAND, President

CONDE NAST, Vice-President and General Manager

E. M. COREY, Secretary and Treasurer

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From Either Side

WHERE do we stand? Mr. A. writes and asks why American automobile builders do not wake up and do something; then comes a letter from Mr. B., who says that America is making greater progress in the art and design of the automobile than any foreign land. Both claim to be right. Mr. A. in defense of his claim points to the progress shown at the recent Olympia exhibition. England has adopted worm drive for touring cars; she has accepted the detachable wire wheel; she took up the sleeve-valve motor four years ago; she has brought out the piston-valve motor; she has recently marketed the new type of single-sleeve valve; she has gone in a wholesale way into four-speed gearboxes; she introduced to the world the fore-door body type; and for a couple of years has been pushing ahead in the development of carbureters, so that six-cylinder cars can average 24 miles per gallon of fuel between London and Edinburgh. This is quite a long and worthy list of achievements—a list that shows engineering and manufacturing activities. But what has Mr. B. to say? He points to the many things that American makers were doing four or five years ago, and which things Europe is just working at to-day. The supplementary coil spring to be used in conjunction with rear springs was brought out and used extensively on this side of the Atlantic over five years ago, and it is just having its innings abroad at present. In Paris one maker is getting more profit out of his factory for these springs than are several of the car builders out of their factories. Thanks to our poor roads we had to have them years ago in order to drive with any degree of comfort over country roads.

Take more important examples: Europe is to-day imitating America in the matter of unit construction of the motor and gearbox. For three or four years this tendency has been gaining ground very rapidly with American makers, and it shows many converts in Europe for next season, one of the most conspicuous being the pioneer Panhard. The American design in which the gearbox is formed as a unit with the rear axle is also showing many gains, not a few of the leading builders—including Sheffield-Simplex, one of the finest engineering houses in England—using this construction for next year.

For several years it has been general in Europe to put one set of brakes on the rear wheel drums and to have the other set on the propeller shaft immediately in rear of the gearbox. During such time American makers were putting both sets on the rear axle. Now Europe has taken up the rear axle scheme and there is a virtual stampede towards it. While America was not the originator of the rear wheel double-brake idea, she was certainly its exponent, and demonstrated that it is correct.

But we must be fair and look at the other side of the picture: Europe was ahead of us on the non-poppet valve motor. Knight had to go to London to get recognition for his double-sleeve valve. He was a prophet without honor in his own land. He mounted into almost instantaneous fame abroad. Daimler, Mercedes, Panhard and Minerva gave him the open door and then the entire world was interested. There were more American engineers visiting Coventry than there were French, German or English. Europe took up the Knight motor and America rushed to get into the band wagon. This was Europe's inning. England set the pace in the lubrication field for motors. De Dion was the pioneer in the non-splash system that is gaining so many adherents to-day, and an American abroad introduced the trough system for oiling the lower connecting rod bearings. Mercedes and many of the other big concerns now interconnect the accelerator pedal and the throttle control with the motor lubrication system, so that when the throttle is opened more oil is fed. In America the users of the Knight type of motor for 1912 use the same system. It is a commendable one, and should be imitated. There are various ways of doing it: Panhard works it by a vacuum control from the mixing chamber of the carbureter, whereas others use the hinged trough as brought out by the Daimler people.

What is the end of the whole matter? There are scores of examples of good pioneering work on either side. It would seem that Europe has been the pioneer in more good things than America, but that America has been quicker to take up a good idea, and the makers in general have adopted it more readily than in Europe. In France and England many individual builders have brought out excellent designs, but it has taken years for the other makers to adopt them, whereas in America imitation is much quicker and vastly more general. Europe has done much experimenting along lines that have not proven desirable for one reason or another. The front-wheel brake is an example of this. So with the matter of side-sway devices to prevent the rear end of the body swaying out too far in taking a curve at speed. It is well to have all these problems settled, and while Europe has been settling hers America has been doing her part. Both are working towards the ultimate; one is of assistance to the other. Europe carried the burden almost entirely at the start, but America is doing nobly at the present time. In America the big problem has been production; in Europe this phase of the situation has not been paramount excepting in a few cases. The Society of Automobile Engineers in America will do and is doing much to develop the pioneering spirit on this side of the Atlantic.

The Legal Field—Allen Suit Proceeds

THE various bumps suffered by the Allen-Kingston Motor Car Co., in 1907, came under the spotlight when the suit of that concern against the Consolidated National Bank and three bank directors came up on the calendar of the New York Supreme Court last week. One of the material witnesses of the plaintiff company is in California and the court was asked for permission to take his testimony by commission.

The facts in the case are that Walter C. Allen, of New York, entered into a contract with the Kingston Motor Co. to build 100 cars. The undertaking of the Kingston company was guaranteed by E. R. and O. F. Thomas, New York bankers, but after six of the automobiles had been practically completed, the company announced that its resources were exhausted, including $16,500 put up by Allen as a deposit. The Thomas guarantee was worded so as to expire if the contract should be assumed by some manufacturing company satisfactory to Allen.

After some rather protracted negotiations, the contract was turned over to the New York Car & Truck Co., Allen claiming that the financing of the manufacturing project had been agreed to by the bankers. He turned back to the company the six unfinished cars and paid in $8,500 more in cash.

In March, 1906, the New York Car & Truck Co. failed and Allen sued the bank and bankers, charging that misrepresentations had been made to get him to turn over the contract to the insolvent company. On the original trial a verdict for $28,463 was given in his favor. This was carried to the appellate division and was reversed and a new trial has been ordered. The first act in the new trial was the granting of an order to take the testimony of a California witness by commission.

It is doubtful whether the full hearing of this case can be had until late in the winter. The original trial occupied several days and the record taken at that time is more than 1,000 pages of closely printed text.

Koehler Suit Against E-M-F Halted

The withdrawal of a juror in the suit for $100,000 damages brought by the H. J. Koehler Co. against the E-M-F Co., halted the proceedings abruptly in that case and will probably result in a delay of several months. The case was called for trial in Part 14 of the Supreme Court on Wednesday and had proceeded but a short time when it was discovered that a bill of complaint would have to be amended to cover a new state of facts that developed. Paul Bonynge, representing the plaintiff company, moved for the withdrawal of a juror and leave to amend the petition.

The suit is based upon alleged failure to conform to the terms of a contract that existed between Koehler and the company in 1908-1909 to represent it in the metropolitan field. The contract called for the delivery of 1,000 cars to Koehler and he contends that only 546 automobiles were so delivered. The company maintains that Koehler's contract was modified by written communications and that it holds a release from the plaintiff against liability arising out of the contract.

Rajah Company Wins Action

The International Automobile League, of Buffalo, and its president (Arthur C. Bidwell) have been adjudged guilty of contempt in violating the terms of an injunction issued against them on behalf of the Rajah Auto Supply Co. There were four counts against the league and one against Bidwell. Fines and costs were imposed.

About a year ago the Rajah company sued out an injunction against the league on the ground that it was selling a porcelain plug similar in exterior appearance to the one of the Rajah company. The injunction included Bidwell in its prohibitions.

The action for contempt was begun quite recently and was decided by Judge Lambert last week.

Another Klaxon Suit Filed

Another action has been filed by the Lovell-McConnell Manufacturing Co., of Newark, N. J., against the American Ever-Ready Co., involving the Klaxon patents. The first suit was filed December 2 in the United States Circuit Court, Southern District of New York, and is based upon alleged unfair competition and imitation of the three basic patents covering the Klaxon warning devices.

The second suit is formulated upon two of the detail patents controlled by the plaintiff company and a third suit, covering the design patents, is being prepared for filing.

The bill prays for an injunction, damages and an accounting.

National Wins Its Axle Suit

When the suit of Lindsay & Harmon against the National Motor Vehicle Co. was dismissed by the United States Circuit Court at Indianapolis, one of the really momentous litigations of the year in the automobile world was settled. The case involved an attempt to establish the exclusive right to manufacture floating axles for the licensee of the complainants, the Timken Axle Co. of Detroit. The case has been pending since 1905 and was argued before Judge Anderson last June. It was set for re-argument in November, but when the matter came up the complainants moved to dismiss it voluntarily.

T. C. A. Double Transcontinental Trip

WASHINGTON, D. C., Dec. 9—President Taft to-day gave an audience to Thomas W. Wilby, pathfinder of the Touring Club of America, and Mrs. Wilby, who arrived in Washington yesterday on the final stage of a double transcontinental tour, which started from New York the last week in August. Mr. and Mrs. Wilby were presented to the President by Leroy Mark, manager of the southeastern department of the Touring Club of America.

President Taft manifested great interst in Mr. Wilby's account of the trip across the continent and back. Commenting on the great influences at work to improve the country's highways, the President said good roads stood for the social and moral uplift of the nation. Later in the day Mr. and Mrs. Wilby were introduced to Speaker Champ Clark and a number of Congressional leaders, who evinced lively interest in the trip now nearing completion. An Ohio car, driven by Fred Clark, is being used by Pathfinder Wilby. The party will leave for New York Monday, arriving there about the middle of the week.

Mr. Wilby and his party reached New York Wednesday completing the great circuit of the country, including 11,000 miles of automobile touring. Upon arrival in New York the party were received at the headquarters of the Touring Club of America, Broadway and Seventy-sixth street. After an informal reception the tourists and escort proceeded to the Holland House, where an elaborate luncheon was served.

NEWS of the WEEK CONDENSED

New England KisselKar auto bus for regular winter service between White Plains and Port Chester, N. Y.

MILWAUKEE, WIS.—Isaac G. Hickman, president of the Hickman-Lauson-Diener Co., state agent for the Ford, was re-elected president of the Milwaukee Automobile Dealers' Association at the annual meeting. Emil Estberg, representative of the Pope-Hartford and Woods and Waverly electrics, was elected vice-president; A. E. Haffauf, of the American Automobile Co., Pierce-Arrow agent, secretary, and August A. Jonas, Cadillac and Peerless, treasurer.

PORTLAND, ME.—G. A. Blanchard has been appointed the new Selden agent in this city.

PORT ANGELES, WASH.—J. C. Leadbetter now has the handling of the Mitchell line here.

SAN DIEGO, CAL.—The U. S. Grant Hotel Garage has taken the agency for the National 40.

DEFIANCE, O.—H. E. Throne has sold the repair department of the Jefferson Garage to C. F. Miller.

NEW HAVEN, CONN.—The White Motor Company has taken the agency for the Reo for this vicinity.

TRENTON, N. J.—The Trenton Taxicab Company has changed its name to the Trenton House Garage.

CHARLESTON, S. C.—The Charleston Motor Sales Co. has taken the agency for the Ford car in this territory.

ROCK ISLAND, ILL.—The Totten Automobile & Supply Company has taken the Lozier and Abbott-Detroit agencies.

PORT HURON, MICH.—The Havers Motor Car Co., of this city, has increased its capital stock from $60,000 to $200,000.

SYRACUSE, N. Y.—The W. King Smith Co. has now taken possession of its new garage at No. 106 North Clinton street.

COLUMBUS, O.—The Front Street Garage & Auto Repair Co., 286 North Front street, has taken the agency for Grabowsky trucks.

SYRACUSE, N. Y.—The local agency for the Stoddard-Dayton has added the Gramm truck to its line. A. W. Zimbrich is manager.

MONTREAL, QUE.—The International Car Agency Co., 855 St. Catherine street, West, has been appointed local agent for the Interstate car.

DYERSVILLE, IA.—J. Friedman, of this city, has contracted to handle the Continental, Kisselkar, E. M. F. and Flanders lines for 1912.

PEORIA, ILL.—The Peoria Auto Co. is now handling the Waverly Electric, for which the Bourdeaux company was the original agency.

CLINTON, ONT.—The Clinton Motor Car Co., Ltd., is the title of a newly incorporated company in this city with a share capital of $100,000.

LOS ANGELES, CAL.—The Studebaker Company's Southern California branch is established in its new home at 1620 to 1624 East Seventh street.

TACOMA, WASH.—J. A. Croston and A. E. Sweet, proprietors of the Sixth Avenue Garage, have secured the agency for the Buick car in Tacoma.

PEORIA, ILL.—The J. C. Warner auto agency has signed a contract with the Metz runabout company to handle the Metz 22 during the coming year.

NEW YORK CITY—The H. W. Bell Company, agent for the Stanley steam car in New York and vicinity, has removed to 247 West Fifty-seventh street.

OMAHA, NEB.—The Lininger Implement Co. closed a contract with E. G. Minnix, of Sioux Falls, S. D., for 125 R. C. H. and Oakland cars for that territory.

BOSTON, MASS.—H. R. Smith, formerly district manager for the Metzger Motor Car Co., is now traveling salesman for the J. S. Harrington Co. in New England.

ATLANTA, GA.—W. T. Downing has prepared plans for a five-story, reinforced concrete building to be erected for the Buick Motor Car Co. at a cost of $50,000.

NEW YORK CITY—The Gallagher-Tompkins Co., of 1876 Broadway, is the newly appointed metropolitan agent for the Selden Motor Vehicle Co., of Rochester, N. Y.

BOSTON, MASS.—B. W. Shaw, formerly in charge of the Park Square Auto Station, has taken charge of the service station of the Empire motor car agency in this city.

BOSTON, MASS.—General sales manager Baker, of the American Motor Car Company, has been in Boston aiding manager Doane of the Essex Automobile Company, agent for the American car, in getting settled in the new salesrooms on Boylston street.

BOSTON, MASS.—In the Middlesex County Court last week fifteen suits, aggregating $88,500, were filed against automobilists. The largest is one of $30,000 against George F. Schraft, a wealthy confectioner of Newtonville, whose car killed Felix Chesnovich in September.

BUCYRUS, O.—Wilbur S. White has taken the agency for the Marion car.

WASHINGTON, D. C.—Earle & Allen have taken the agency for the R. C. H. car.

STERLING, ILL.—M. R. Thackaberry, local agent for the Cole car, has moved from 316 First street to 601 West Third street.

BOSTON, MASS.—J. H. Crocker is the latest addition to the sales-force of the New England branch of the Marquette.

INDIANAPOLIS, IND.—W. T. Hutchinson, of Hempstead, L. I., and Winthrop Pier, El Centro, Cal., have been appointed agents for the Cole car.

WASHINGTON, D. C.—Earle & Allen, agents for the R. C. H. and Hupp-Yeats, have removed from 1612 Fourteenth street, N. W., to larger quarters at 1214 Eighteenth street.

CAIRO, ILL.—Glenn Tracy has purchased the automobile sales business of Wood, Gorham & Wood, of this city, and will handle the Ford car in the eastern part of Henry County.

AUBURN, N. Y.—George H. Leonard has secured the contract to sell Franklin automobiles in this territory under the supervision of the Syracuse branch of the Franklin Automobile Co.

NEW YORK CITY—The Colonial Sales Co. has taken the distributing agency for the G. J. G. car. The company is located in the Colonial building at Broadway and Sixty-sixth street.

WASHINGTON, D. C.—W. Elkins Reed has opened an automobile supply house at 1218 Connecticut avenue. T. Lamar Jackson, agent for the Stevens-Duryea, has leased a portion of the store.

NEW YORK CITY—Chas. E. Riess & Co., general distributors of the Marion car and the American-Marion Sales Co., have moved into their new quarters at Broadway and Sixty-third street.

WAKEFIELD, MASS.—At the fall town meeting the recommendation of a committee that the town purchase a motor fire truck was accepted and $3,800 was appropriated for the purpose.

MOLINE, ILL.—Jack Stickney, of the Velie Motor Vehicle Co., has bought a Bleriot monoplane and will take up aviation in the spring. He is now experimenting with a motor for the machine.

SEATTLE, WASH.—Organizing in this city recently the Motor Distributing Co. will hereafter handle the Lozier car. T. A. Davis is president and treasurer and T. G. Young secretary and manager.

BOSTON, MASS.—The J. S. Harrington Company, agent for the Everitt car, has appointed J. H. Burkhard traveling inspector. Mr. Burkhard was formerly in charge of the Everitt service station.

SYRACUSE, N. Y.—George E. Messer, manager of the Syracuse branch of the Franklin Automobile Co., has resigned to become sales manager for F. W. Bird & Son, paper manufacturers, of Boston, Mass. Mr. Messer will have charge of the Western territory.

INDIANAPOLIS, IND.—The following Cole agents have new salesrooms and service stations: E. E. Loving Auto Co., Memphis, Tenn.; Imperial Motor car Co., Cincinnati, O., and J. E. Morehouse, Milwaukee, Wis.

OKLAHOMA CITY, OKLA.—The Penn Motor Car Company, of Pittsburgh, Pa., has designated Oklahoma City as its southwestern distributing point for the Penn 30 and the Penn 40 and light delivery trucks.

OKLAHOMA CITY, OKLA.—According to the annual report of the state auditor, made from the certified report of the county tax boards, there are 3,459 automobiles in the State. A total value of $2,648,845 is given.

ST. PAUL, MINN.—The new automobile tags for this state are of aluminum in which the black lettering is sunk. Under the new law these tags will be good until the end of 1914 instead of for only one year.

COLUMBUS, O.—The Union Sales Co. has appointed the following agents for the Union 25: Crowe Motor Car Co., Minneapolis, Minn.; Marx Bros., Milwaukee, Wis., and McNabb Garage, Newport, Tenn.

CHICAGO, ILL.—F. H. Quick, formerly with the Gibson Auto Company, of Indianapolis, Ind., and United Motors Indianapolis Company, has joined the sales force of the Findeisen & Kropf Manufacturing Company.

JANESVILLE, WIS.—The Sykes & Davis Garage has passed into the hands of the Janesville Auto Company, a new $10,000 corporation formed here to handle the Flanders, E. M. F. and Overland lines in Rock County.

MILWAUKEE, WIS.—The report of the building commissioner of Milwaukee from 1896 to 1910, just issued, shows that during the year 1910 there were constructed in Milwaukee eighty garage buildings, representing an investment of $107,350. The record for 1911 will show a considerable gain over these figures.

CINCINNATI, O.—H. E. Taylor has resigned his position with the Automobile Supply Company of Chicago to join the sales force of the Olds-Oakland Motor Company. Mr. Taylor will have charge of the local retail business.

AKRON, O.—The Swinehart Tire & Rubber Co., this city, has under consideration plans for a large addition to the plant on North Howard street. The new building will be 50 by 200 feet and will be built just west of the present plant.

MONTREAL, QUE.—John Wells, formerly manager of the tire department of the Canadian Rubber Co., of this city, has resigned to take the position of sales manager of the P. Gadbois Co., representative for the Cole and E-M-F in eastern Canada.

DETROIT, MICH.—The Elmore Automobile Company, of this city, is now occupying its handsome new home at 754-756 Woodward avenue. The building, which is two stories in height, is of brick and concrete and is furnished with large show windows. M. A. Young is president of the company, which handles the Elmore cars and the Waverley Electrics.

CLEVELAND, O.—The Baker Motor Vehicle Company recently held a convention of its commercial car salesmen at the factory. Representatives were present from various parts of the country, including New York, Boston, Chicago, Buffalo and Newark. Salesmanship, factory methods and the company's product were studied for three days. The convention ended with a banquet at the Hollenden.

Convention of Baker commercial car salesmen at the factory

President Taft in a KisselKar at Huron, S. D., during recent Western trip

GREEN BAY, WIS.—Tooen & Barlament are erecting a $5,000 garage and sales-office building at George and Wisconsin streets.

MILWAUKEE, WIS.—J. M. Peil, of Racine, Wis., has been appointed manager of the local Mitchell branch to succeed F. P. Wilkins.

OAKLAND, CAL.—Curtis G. Heckenlively, of this city, has been appointed Pacific Coast distributor for the Universal Tire Protector Co., of Angola, Ind.

TORONTO, ONT.—The Cutting Motor Sales Co. of Canada, 76 Adelaide street, has been appointed wholesale distributor for Canada of the Cutting car and is busy placing agencies in large Canadian cities.

SYRACUSE, N. Y.—R. W. Sherman has resigned from the publicity department of the Franklin Automobile Co. and will devote his time to special writing in connection with automobile trade publications and newspapers.

MILWAUKEE, WIS.—The Jos. Obernberger Co., 126 Ferry street, has been appointed local agent for the Monitor commercial car, manufactured by the Monitor Automobile Works, of Janesville, Wis., formerly of Chicago.

NEW YORK CITY—New salesrooms have been opened by the Ajax-Grieb Rubber Co. for the sale of Ajax tires in Detroit and Denver. In the Michigan city a move has been made to 507 Woodward avenue, from 745 Woodward avenue.

DETROIT, MICH.—P. S. Beamer, who has been associated with President Everitt of the Metzger Motor Car Co. for a long period, has been made general auditor of that company and will have entire charge of all accounting and similar work.

ROCHESTER, N. Y.—The Selden Co. has opened a new salesroom at No. 119 East avenue. This is a branch of the factory used for sales purposes only, as the repair department is still maintained at the factory. W. C. Barry, Jr., is in charge.

ADRIAN, MICH.—The following agents have been appointed by the Lion Motor Car Co. of this city, to handle its 1912 line: Reliance Auto Co., San Francisco, Cal.; F. W. Hull, Boston, Mass., and the Joseph B. Deibler Motor Car Co., Chicago, Ill.

SHEBOYGAN, WIS.—August H. Prange, dealer in motor cars and farm machinery at Potter, Wis., has disposed of his interests in that city to Piepenburg & Reichert, of Reedsville, Wis., and will engage in the automobile business in Sheboygan.

TORONTO, ONT.—The Wolseley Tool & Motor Car Co., Ltd., has opened a Canadian branch here and is at present in a temporary office at 49 Wellington street, East, pending the erection of its new garage and salesroom at 81 Avenue road.

WACO, TEX.—William Amthor has retired from the firm of the Marion Auto Company. He sold his interest in the business to Grim Brothers, who will conduct business under the name Marion Motor Company at the same location, 700 Austin avenue.

WAUKESHA, WIS.—The Waukesha Motor Co., with 100 employees, has elected to come within the provisions of the new Wisconsin industrial insurance or workmen's compensation act, which was declared constitutional by the state supreme court several days ago.

MILWAUKEE, WIS.—The Kopmeier Motor Car Co., 375-389 Summit avenue, agent for the Fiat, Chalmers and Detroit Electric, has placed in service a 150-horsepower gas engine as additional equipment for the production of current for charging electric vehicles.

DETROIT, MICH.—George Main, formerly assistant traffic manager at the Chalmers plant, has been appointed traffic manager at the Metzger Motor Car Co. plant. Mr. Main has been connected with the traffic service for many years and is regarded as an expert in his line.

DETROIT, MICH.—George B. Pratt, formerly sales manager of the Dean Electric Company, of Elyria, O., has joined the sales force of the Anderson Electric Car Company. Mr. Pratt will have charge of sales in Ohio and in part of New York and Pennsylvania.

CHICAGO, ILL.—F. W. Grubb, of the Fulton & Grubb Co., manufacturers' agents, has severed his active connection with that company to accept the position of manager for the Excelsior General Supplies Co., 1436-1438 Michigan avenue. Mr. Grubb retains his financial holding in the Fulton & Grubb Co.

PEORIA, ILL.—On December 15 Braren Brothers, proprietors of the Turnbull agency and garage here, will commence handling the Flanders electric and White gasoline cars. They have also contracted for the agency for the Moon car, previously held by the Reliance Motor Car Co., of this city.

SALEM, ORE.—The automobile department of the Secretary of State's office recently received 6,000 numbers or 12,000 tags, weighing over 7,000 pounds, for use in registering automobiles during 1912. In addition, 2,000 chauffeurs' badges have been ordered. The number tags, which are issued in duplicate, have black figures against a green background.

SEATTLE, WASH.—The largest building permit issued in Seattle recently was issued to Olaf Olson, providing for the immediate erection of a two-story class A garage designed for four stories and covering a ground space 80 by 120 and 40 by 40 feet. The garage will be located at 1205-1211 East Pine street and will cost $28,000.

SYRACUSE, N. Y.—B. J. Lane, of The Lane Auto Association, has taken over the management of The Syracuse Regal Co. and will act as the distributor of the 1912 Regal line as well as the KlineKar. Both The Syracuse Regal Co. and The Lane Automobile Association will have headquarters at No. 1205 West Genesee street.

TOLEDO, O.—The board of review is having a list made of all automobiles owned in the city as shown by the state license records for the purpose of enforcing the payment of taxes on machines, many of which have heretofore escaped taxation According to the president of the board only about one-half of the automobiles owned in Toledo were returned for taxation last year.

DETROIT, MICH.—Charles W. Price, president of the Electrical Review Publishing Co., announces the purchase of *Electrocraft*, an electrical journal largely devoted to electrical contracting and electrical supplies. Three electrical journals, the *Electrical Review*, the *Western Electrician* and *Electrocraft*, will, after January 1, appear as one weekly publication with main offices in Chicago and branch offices in New York and London.

PITTSBURGH, PA.—The Pittsburgh Inter-State Co. will handle the Stutz and Warren cars during the coming year.

BOSTON, MASS.—Chief engineer Wicks of the H. H. Franklin Co. has been spending several days at the Gray & Davis lamp factory going over details of equipment for automobiles.

PORT HURON, MICH.—Mr. B. F. Blaney, formerly general sales agent for the Johnson Service Co. of Milwaukee, has taken the position of sales manager for the Havers Motor Car Co.

SAN FRANCISCO, CAL.—The C. & F. Motor Car Co., has opened a salesroom at 436 Van Ness avenue, and will handle the Stutz car, manufactured by the Ideal Motor Car Co., of Indianapolis.

BOSTON, MASS.—John Cooper, formerly manager of the New England branch of the Ajax-Greib Rubber Co., has returned to the tire industry and is now representing the Endurance Tire & Rubber Co., in this territory.

INDIANAPOLIS, IND.—Paul P. Willis has been appointed advertising manager for the National Motor Vehicle Co. Mr. Willis was formerly automobile editor of *The Indianapolis Star*. He is secretary of the Hoosier Motor Club.

BUCYRUS, O.—The Seagraves Co. of Columbus, O., delivered to the fire department of Bucyrus, O., a new auto fire truck. The engine is of 80 horsepower and carries 1,200 feet of hose as well as ladders and chemical appliances.

INDIANAPOLIS, IND.—The recently organized Merchants' Auto Co. of Indianapolis has taken over the Delaware Garage at 214 North Delaware street and the new Colonnade Garage at 9 East Pratt street. E. Frank Brown has recently become general manager of the company.

COLUMBUS, O.—*The Exhaust* is the name of a new monthly publication issued by the Columbus Automobile Club. Club news, notes of the good roads movement and other matters of interest to automobilists generally will be contained in the publication. Allen F. Koch is editor.

COLUMBUS, O.—The Cummins Auto Sales Co., of North Fourth street, has placed the following sub-agencies in Ohio territory; E. O. Fogle, automobile company, Cambridge, Elmore; D. S. Spangler, Thornville, Elmore; R. E. Wildermuth Automobile Co., Pleasantville, Krit.

COLUMBUS, O.—The Hudson Sales Co., of North Fourth street, Columbus, O., has closed contracts for the following sub-agencies: J. R. Armstrong, Lima, Hudson; in Allen, Van Wert, Mercer and Auglaize counties; Walker & Son, Lancaster, American, in Fairfield, Pickaway, Ross and Fayette counties.

INDIANAPOLIS, IND.—A contract for the delivery of its papers to news-stands, depots and sub-stations has been let by *The Indianapolis News* of Indianapolis, to the Central Transfer and Storage Co., of that city. The transfer company has purchased for the work five Mais trucks, four Premier trucks, one Overland truck and a Reo truck.

BALTIMORE, MD.—Announcement has been made by A. Maurice Eastwick and Robert F. Kaehler that the partnership of the local branch of the Ford Auto Co., handling the Ford cars in Maryland and Virginia, has been dissolved. Mr. Eastwick will continue in charge of the local agency, which will also include the state of Maryland, while Mr. Kaehler will remain in charge of the Ford Auto Co., in Richmond, Va., as agent for the Ford Car in that city and the remainder of Virginia.

Automobile Incorporations

AUTOMOBILES AND PARTS

BROOKLYN, N. Y.—Prudence Motor Truck Co.; capital, $100,000; to build freight automobiles. Incorporations: Herbert Cooper, Arthur Cooper, Alfred G. Leomans, Charles G. Diegest, Franklin C. Haven.

CAMDEN, N. J.—Penn Motor Car Co.; capital, $500,000; to build motor cars. Incorporators: V. A. Murray, L. A. Myers, Doering Ballinger.

MILWAUKEE, WIS.—Wisconsin Auto Sales Co.; capital, $20,000; to sell automobiles. Incorporators: George P. Hewitt, R. L. Anderson.

NEW YORK CITY.—New York Motor Works, Inc.; capital, $70,000; to build automobiles and engines. Incorporators: M. L. Rogers, S. E. Robberson.

NEW YORK CITY.—Gurlitt-Brown-Davis Co.; capital, $25,000; to make and sell motor vehicles. Incorporators: H. Gurlitt, David S. Davis, Jr., V. C. Bogardus.

NEW YORK CITY.—Detmar Auto Sales Co.; capital, $20,000; to manufacture and sell automobiles and engines. Incorporators: John J. McLaran, F. B. Knowlton, Edward C. Inderlied.

NEW YORK CITY.—Wishart-Dayton Auto Truck Co.; capital, $25,000; to manufacture automobiles. Incorporators: R. A. Inch, S. E. Wishart, J. B Smith.

NEW YORK CITY.—Parker Motor Wagon Co.; capital, $10,000; to make and sell motor cars Incorporators: Harry C. Cottfried, Drew McKenna, Chas. E. Wood.

NEW YORK CITY.—Mooer Auto Co.; capital, $450,000; to make automobiles. Incorporators: E. J. Bosse, G. Leveene.

NORTHAMPTON, PA.—Siegfried Motor Car Co.; capital, $10,000; to sell automobiles.

PHILADELPHIA, PA.—C. V. Stahl Motor Co.; capital, $5,000; to sell motor cars.

RICHMOND, VA.—American Adjustable Wheel Co., Inc.; capital, $100,000; to manufacture and sell adjustable automobile wheels. Incorporators: J. H. Pinner, J. C. Davis, R. H. Bruce.

ROANOKE, VA.—Roanoke Motor Car Co.; capital, $25,000; to sell automobiles. Incorporators: Frank Welch, Sr., J. E. Shickle, Frank Welch, Jr.

ROCHESTER, N. Y.—Turk & Brown, Inc.; capital, $10,000; to manufacture motor vehicles. Incorporators: Sophie H. Brown, Alfred H. Brown.

SELMA, ALA.—Central Alabama Motor Car Co., Inc.; capital, $1,500. Incorporator: George H. Ashburn.

SPRINGFIELD, ILL.—Flexo Motor Co.; capital, $30,000; to manufacture engines. Incorporators: Fred C. Miller, Wm. Wishart, Henry L. Smith.

WILMINGTON, DEL.—Williams Steel Wheel, Rim & Tire Co.; capital, $1,000,000. Incorporator: William E. Williams.

WINDSOR, ONT.—Canadian Two-in-One Auto Co.; capital, $200,000; to manufacture automobiles.

AUTOMOBILES, GARAGES, ETC.

BOSTON, MASS.—Morsa-McDonald Co.; capital, $15,000. Incorporators: John D. McDonald, John S. Moore, James H. Matthews.

BUFFALO, N. Y.—Carroll Tire Co.; capital, $200,000; to make and sell rubber tires. Incorporators: John Gregson, George Cunliffe, J. E. Gregson.

CHICAGO, ILL.—F. A. L. Auto Co.; capital, $2,500; to sell automobiles and operate a garage. Incorporators: Frederick C. Harbour, Clinton S. Limb, E. N. Lundberg.

CHICAGO, ILL.—National Automobile Owners' Alliance; capital, $50,000; to make automobile accessories and parts. Incorporators: W. G. W. Ford, C. E. Becker, S. C. Miller.

NASHVILLE, TENN.—Hermitage Auto & Livery Co.; capital, $3,000; to conduct a garage business. Incorporators: L. W. Jacobs, W. F. Jacobs, E. L. Holt, T. Allison, Harry A. Stokes.

NEW YORK CITY.—Batavia Co., of Pa.; capital, $30,000; to make and sell tires for automobiles. Incorporators: Harry W. Newburger, Maxwell Lustig, D. Weiss.

NEW YORK CITY.—Cosmopolitan Motor Co.; capital, $10,000; to conduct a garage business. Incorporators: John Devine, John J. Kirby, Albert G. Armento.

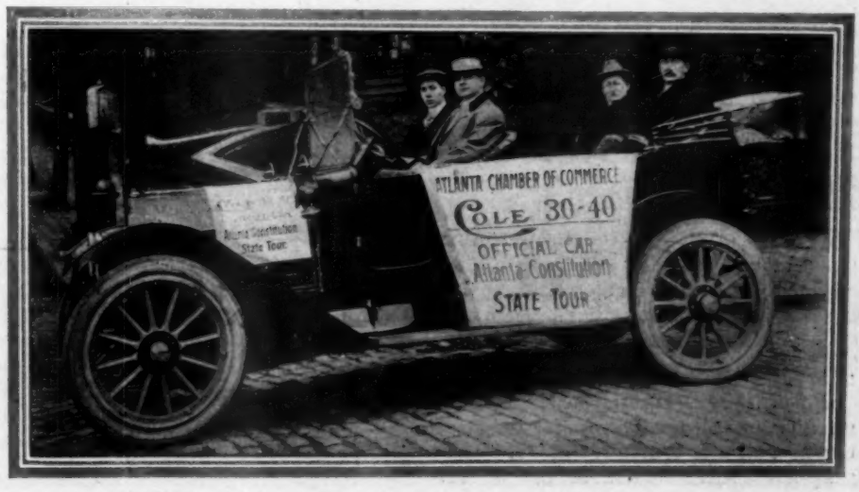
NEW YORK CITY.—H. & C. Garage; capital, $10,000; to deal in, repair and store automobiles. Incorporators: Louis S. Hallowell, Herbert S. Cole, Arthur J. Cole.

NEW YORK CITY.—Security Motor Switch Co.; capital, $10,000; to make motor switches and engine accessories. Incorporators: Albert Meadows, J. E. Cleveland, E. P. Beechler.

NEW YORK CITY.—Simpson Tire Fibre Co.; capital, $100,000. Incorporators: S. L. Simpson, James D. May, Harry J. Dingemann.

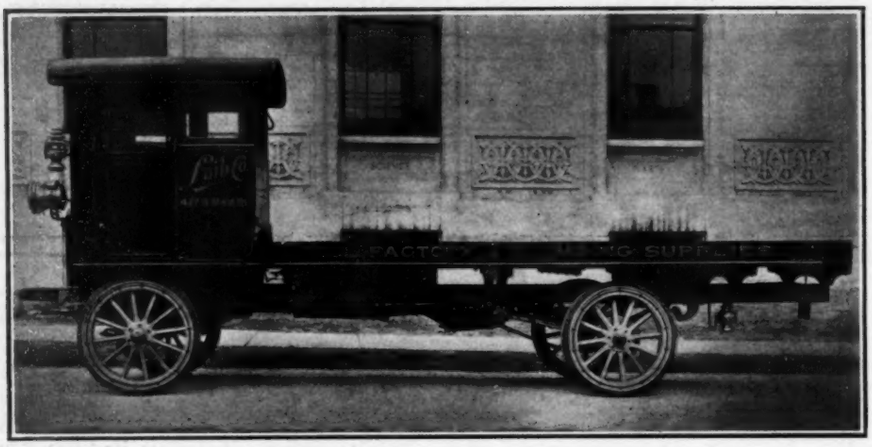
PERRY, OKLA.—Automatic Motor Plow Co.; capital, $200,000. Incorporators: A. A. Hullum, S. P. Rogers, H. F. Carmichaels.

SAVANNAH, GA.—Auto Sales & Livery Co.; capital, $50,000; to conduct a garage business. Incorporators: H. W. Freeberg, E. J. Freeberg, G. R. Morehouse.



Harry Knight driving Cole 30-40 in which the officials rode in the Tour Around Georgia

OF INTEREST to the INDUSTRY



Three-ton truck made by Transit Motor Car Company, Louisville, Ky.

NEW MARKET, ONT.—The Harding Motor Co. has decided to move from London, Ont., to this city.

PITTSBURGH, PA.—The Rotary Motor Co. has awarded the contract for an addition to its plant to the W. N. Kratzer Co.

VICTORIA, TEX.—The Texas Motor Car & Supply Company has let the contract for the erection of an addition to its machine shop.

INDIANAPOLIS, IND.—The International Metal Polish Company, of this city, has broken ground for a new factory to cost $25,000.

KEIL, WIS.—The Keil Motor Car Company, organized by Fred Theissen and Phillip Juenheimer, will build a plant here to cost $14,000.

DETROIT, MICH.—The Briggs-Detroit Co. has purchased a 2-acre factory site on Holbrook avenue from the Reinforced Concrete Pipe Co., of Jackson, Mich.

ANDERSON, IND.—Contracts have been awarded for the addition to the factory of the Remington Electric Company, which manufactures magneto ignition apparatus.

SYRACUSE, N. Y.—The Brown Company has commissioned local architects to prepare plans for a two-story brick factory here, of mill construction, 50 by 160 feet.

VANCOUVER, B. C.—The Central Auto Co., Franklin dealer in this territory, is rebuilding its garage, recently destroyed by fire. In its new quarters this concern will be in a better position than ever to handle business at this point.

DETROIT, MICH.—The Hupp Motor Company has awarded a contract for the erection of a plant at Windsor, Ont. The company has also taken out permits for the erection of a two-story brick factory to cost $65,000 at Mt. Elliot and Milwaukee avenues, in this city.

NEW YORK CITY—J. F. Hayes and W. S. Miller, formerly with the Rainier Motor Co., have incorporated a business under the name of Hayes & Miller Co. to paint and repair automobiles and to manufacture tops. The company is located at 317 West Forty-seventh street.

BUFFALO, N. Y.—George Ostendorf, formerly branch manager of the Franklin Automobile Co. in Buffalo, has purchased the branch and will hereafter conduct the business on a dealership basis under his own name. Mr. Ostendorf will retain his salesroom at No. 683 Main street.

DETROIT, MICH.—J. H. Newmark, who has been associated with the Oakland Motor Car Co., Pontiac, Mich., in the capacity of advertising manager, has been transferred to the office of the General Motors Co., Detroit, Mich., where he will assume a position as assistant to advertising manager Kurtz.

HAMILTON, O.—C. A. MacCordy, formerly connected with the advertising and publicity department of the H. H. Franklin Manufacturing Co., of Syracuse, N. Y., as superintendent of printing, has accepted a position with the Republican Publishing Co., catalogue makers of this city, as special automobile trade representative.

LOS ANGELES, CAL.—Ralph C. Hamlin, Franklin dealer in this territory, has just been informed by the Bosch Magneto Co., that he is entitled to the second prize, $75.00, offered by that company to the driver of the second car finishing in the Los Angeles desert race, provided the car driven was equipped with a Bosch magneto.

MILWAUKEE, WIS.—The Milwaukee Auto Specialty Company, recently incorporated with an authorized capital of $75,000, has selected a site for its proposed new manufacturing and sales building at Seventh and Chestnut streets. The building will be five stories high, of reinforced concrete and steel construction, and will contain a large garage.

CRANSTON, R. I.—At the plant of the Maxwell Briscoe Motor Company, here, the rush of work has been so great that some of the departments were not able to keep up with the others, and as a result about 200 men were laid off temporarily. It is expected that the men will resume work again shortly, as the demand for the cars taxes the capacity of the plant.

INDIANAPOLIS, IND.—George Bott, formerly employed by the Nordyke and Marmon Co., is the inventor of a radiator-cover which is to be manufactured by the newly organized Antidam Manufacturing Co. in this city. The cover is made of pantasote and sheet metal, fitting closely to the radiator being fastened at the top over the radiator-cap and at the bottom by the crank.

DETROIT, MICH.—The McCord Manufacturing Co. has acquired the materials, patents and good will of the Precision Appliance Co. of Chicago, and will manufacture the Hifl-Precision lubricators in connection with its former product. The company has added a cellular radiator to its line. An addition of 12,000 square feet has been made to the factory building and one of 4,000 square feet to the foundry.

BOSTON, MASS.—Otto A. Lawton, formerly connected with the Franklin Automobile Co. of Syracuse, N. Y., as manager of the branch in Boston, has purchased the branch and will conduct the business under the name of the Franklin Motor Car Company, of Boston. In connection with his dealership in Franklin cars Mr. Lawton will conduct a taxicab business with stands at the Hotel Somerset and Hotel Puritan.

AKRON, O.—A 50 per cent. increase in business in the past year was reported at the annual meeting of the Goodyear Tire & Rubber Co., held this week. Big buildings have been added, new salesmen and workmen taken on and the business of the company has had marked development along many lines. Forty branches have been established throughout the country and a new office building, the latest of a series of additions, is now under construction. The officers elected are: Frank A. Seiberling, president, Charles W. Seiberling, vice-president; G. M. Stadelman, secretary; F. H. Adams, treasurer, and P. W. Litchfield, factory manager.

PATENTS GONE TO ISSUE

CARBURETER—In which the flow of fuel is regulated by a rotary valve.

5. The carbureter seen in Fig. 1 comprises a casing, in which is contained a mixing chamber for air and fuel, and a valve controlling air and fuel passage through the chamber in which a rotary fuel discharge valve is located. Valves are provided for admitting a variable supply of fuel to the pipe, and also means for effecting cooperative action of the rotary valve, admission valve mechanism and pipe, the valve mechanism being composed by a member with a recess in its face and open at its end to admit fuel thereto, a second member faced against the first and having an elongated port through it for registering with the recess mentioned, and a cap which is applied to and forms a chamber between itself and the second member. This member communicates with the discharge pipe, and one of the two members is stationary and the other rotary in the discharge pipe.

No. 1,010,714—To George J. Zisch, Newark, N. J. Granted December 5, 1911; filed May 12, 1910.

LOW PRESSURE TIRE SIGNAL—Indicates when inflation falls below a predetermined point.

This device (Fig. 2) consists of a body adapted to engage with a tire valve and having a central chamber; the body has an air inlet at its lower end and an air escape opening in its side, and in the chamber a partition is fixed between the openings thereof, the partition having a central opening. A disc is fixed in the chamber opposite the escape opening of the body and a portion of the disc is cut off. An adjustable plug is stationed in the upper end of the head, with a central rod passing through plug, disc and partition, and terminating below the latter. A valve and coiled spring are mounted on the rod.

No. 1,010,726—To Joseph M. Collins, Gorman, Tex. Granted December 5, 1911; filed January 31, 1911.

FRICTION CLUTCH—In which two conical members engage a collar, thus providing connection between driving and driven unit.

In this clutch (Fig. 3) two conical members are mounted on a shaft in spaced relation and with their conical faces opposed. One of the two cones is fixed on the shaft and the other movable toward and away from the first member, and a collar on the shaft limits the movement of the movable member.

The hub portion of a wheel is shaped to fit between the two conical faces and to rotate on them. On the collar several cams are pivotally mounted, having cams which extend radially outward. Means are slidably mounted on the shaft, by which the cams may be shifted into or out of position for holding the movable member in gripping relation with the hub.

No. 1,011,040—To John J. Dennison, Chicago, Ill. Granted December 5, 1911; filed July 1, 1911.

SPEEDOMETER—Utilizing the transmission of motion through an air current produced in the apparatus.

2. This speedometer (Fig. 4) has a tight enclosure and a hollow cylindrical member held in spaced relation to the walls thereof, so as to form an unobstructed annular space. In this cylinder air currents are produced acting upon means responsive to the air currents, these means operating a device indicating the force of the currents.

No. 1,011,051—To Louis A. Greenleaf, Dorchester, Mass. Granted December 5, 1911; filed June 9, 1910.

VEHICLE TOP FASTENER—Apparatus for securing top holding members to the body of the automobile.

2. This patent refers to a canopy fastener comprising a supporting frame having pendent lugs, and latch casings carried by the seat in a car, bolts being contained by the casings. The bolts carry means for interlocking engagement with lugs supporting tubes for the casings mentioned. Rods extending through the tubes have crank arms for operating the bolts, and means are provided to oppose the rotation of the rods in one direction.

No. 1,010,968—William Spickernagle, Owensboro, Ky. Granted December 5, 1911; filed February 6, 1911.

GAS ENGINE—Of the double sleeve reciprocating type.

3. This patent covers an internal combustion engine, with a stationary working cylinder having inlet and exhaust ports and a pair of segmental or half-cylindrical slide valves with ports disposed around the cylinder. The slide valves may be operated to bring their ports to register with the inlet and exhaust ports in the cylinder on both up stroke and down stroke of the valves. A compression-retaining ring surrounds inlet and exhaust ports both circumferentially and vertically.

No. 1,010,566—To Arthur Alltree, Manchester, England. Granted December 5, 1911; filed January 19, 1910.

INDICATING TAIL LAMP—Lamp and frame for illuminating license-plate.

1. This patent relates to an outfit comprising a frame adapted to be secured to a vehicle; a horizontal base secured to the frame and suitable lamps carried at its end by the frame. On the base is stationed a box adapted to receive lights from the lamps and containing warning mechanism. Detachable chimneys for the lamps are adapted to secure the box to the frame.

No. 1,010,806—To Maurice S. Rosenfeld, New York. Granted December 5, 1911; filed August 26, 1911.

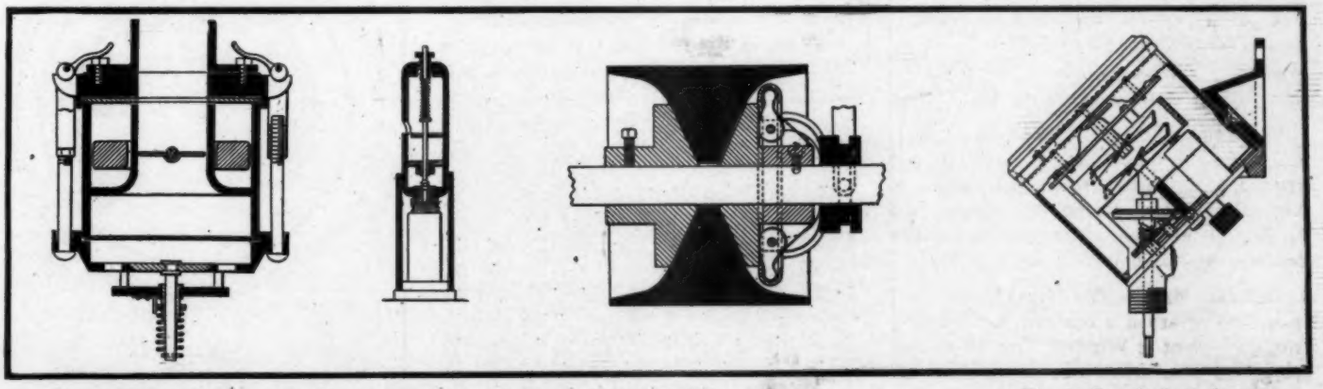


Fig. 1—Zisch carbureter Fig. 2—Collins' tire signal Fig. 3—Dennison clutch Fig. 4—Greenleaf speedometer

Newest Ideas Among the Accessories

No-Key Padlock

FIGURE 1 is an illustration of the Keyless padlock which may be used for all purposes where this type of lock is advantageously applied. The distinguishing characteristic of this device is that it is locked and unlocked without the use of a key, being complete in itself. The outside of the lock, which is finished in brass, is seen in Fig. 1. This is a front view. There are eight buttons on the front side of the lock and eight on the reverse side, and each of these buttons can be depressed. The buttons, that is, a number of them, for instance, three, are used as a combination which, if properly worked, opens the lock. The combination goes with the lock when this is bought, but no note of it is made on the lock itself. Suppose the combination reads: up, 3 and 6; down, 2. In order to open the lock buttons 3 and 6 are pressed in on the reverse side, and 2 on the front side, all at the same time. This united pressure on the buttons in the combination opens the lock instantly by releasing the male jaw, which is then thrown out of its engagement with the female jaw, while an internal spring throws up the male jaw and opens up a gap between it and the mating jaw.

More than 40,000 combinations are possible, according to the maker, on each lock, so that there is practically no chance of strangers opening the lock. It is of simple and rigid construction and lends itself for manifold uses, in locking the levers to the steering wheel or holding the gear-shift lever in neutral through the combined use of a chain and this lock. The one feature of the lock requiring no key is attractive enough, since with the use of this padlock there is no possibility of losing a key, and as a result being at a loss with regard to the locking or unlocking of the lock the key belongs to. The lock is made by the American Keyless Lock Co., 417 South Dearborn street, Chicago, Ill.

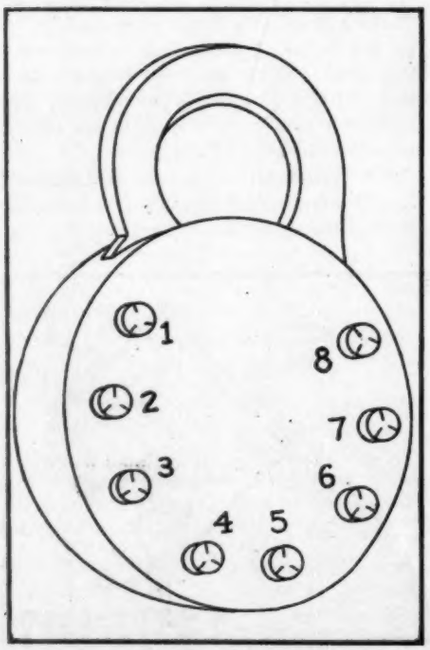


Fig. 1—Keyless padlock

D. K. W. Carbureter

The D. K. W. carbureter, which is shown in Fig. 2, is automatic in a way, in that the ratio between gasoline and air is fixed after the carbureter has once been adjusted for the needs of the engine. The automatic effect is obtained by three auxiliary valves.

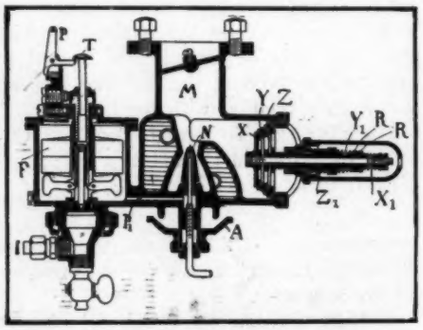


Fig. 2—D. K. W. carbureter

The gasoline on its way from the tank enters the carbureter through the inlet I, flowing up through the float chamber and passageway P1 to the nozzle N, and thence through the mixing chamber M to the intake valve of the motor. In installing the carbureter on the car, the adjustable air cup A is first placed in mid-position; then the valve stem is screwed up to close the nozzle tightly, and thereafter opened about one turn, which brings about an approximately correct aperture. The exact opening is determined by experimenting. To prime the carbureter, rod P is so moved as to lift the float valve stem at its top T, permitting the gasoline to flow into the chamber. If the motor, when running at low speeds, shows a tendency to back-fire, stem S is turned outward to enrich the mixture.

The operation of the triple auxiliary air valve is as follows: When the motor draws more air than can pass through the annular opening on top of the cup A, the first auxiliary valve X is sucked toward the motor and lifted off its seat. This permits an additional quantity of air to flow to the engine, but if the suction still increased, the additional lift of valve X compresses its spring X1 to such a degree that part of its compression is transmitted through spring retainer R1 to R and thence to spring Y1, causing the second valve Y to open and admit more air. If the suction is further increased, the last valve Z is opened and the maximum amount of air obtained. The Duquesne Auto Accessory Co., of New Kensington, Pa., makes this carbureter.

Schubert Tire Gauge

The Schubert tire pressure tester, Fig. 3, is made in the shape and size of a watch, and may be carried in the vest pocket. The case is made of highly polished nickel, the front side being as illustrated, and the reverse plain metal. The tester is operated by simply pressing the part A on the tire valve, whereby air is admitted from the tire to flow into the gauge, where it moves the finger on the dial to the position indicating the air pressure in the tire. The air or gas is retained in the gauge, which it enters through a non-return valve, and is released by pressure exerted upon the release button R. This construction of the gauge makes it possible for the motorist to make a quick test of the tire pressure without getting down on his knees, and take the reading off the gauge in a comfortable position. The correct pressures for various sizes of tires, as given by the tire manufacturers, are marked on the gauge, which is made by the United States Gauge Co., 67 Wall street, New York City.

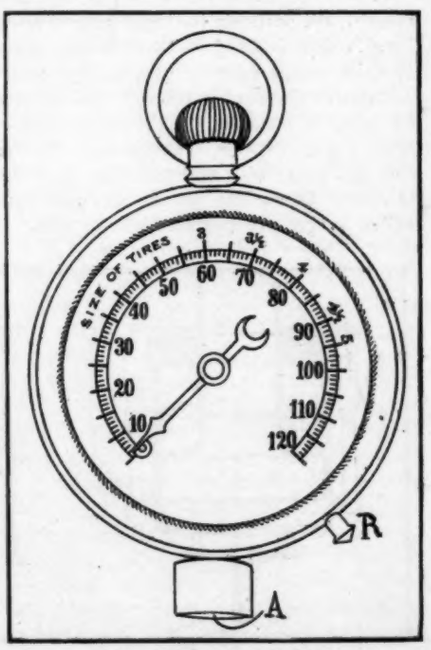


Fig. 3—Schubert tire gauge